



STAFF REPORT

Meeting Date: August 26, 2014

Agenda Item #10A

Agency: City of Belmont

Staff Contact: Afshin Oskoui, Public Works Department, 595-7459, aoskoui@belmont.gov, or
Bozhena Palatnik, Public Works Department, 595-7463, bpalatnik@belmont.gov

Agenda Title: Approval of Ralston Avenue Corridor Study and Improvements Plan

Agenda Action: Resolution

Recommendation

Adopt a resolution approving the Ralston Avenue Corridor Study and Improvements Plan as a Corridor Context Sensitive Plan.

Background

The Ralston Avenue Corridor Study and Improvements Project is identified as a Council Priority project. The goal of the project was to conduct a comprehensive study to determine the adequacy of existing and future traffic conditions, circulation, physical inventory of the gaps, and a multi-modal evaluation of the traffic operations related signals, pedestrian and bicycle facilities, transit, and parking in the corridor. Furthermore, developing context sensitive transportation improvement alternatives which incorporated, and enhanced, the diverse roadway characteristics encountered along the entirety of the corridor was important.

The Project was divided into three phases:

- Phase I – Data collection, community outreach meetings/workshops with residents, business owners, schools and stakeholders (Council and Planning Commission among others)
- Phase II – Mobility assessments and identifying issues along the corridor based on the collected data and Council/community outreach meetings/workshops, develop draft alternatives and draft budget
- Phase III – Develop final alternatives, short term and long term capital improvement projects, associated budgets and funding strategies

On February 12, 2013, City Council approved a contract with Whitlock and Weinberger Transportation, Inc. to conduct Phases I and II of the Ralston Avenue Corridor Study. Phase III of the Study would be authorized upon approval of the results of Phases I and II. Because the corridor is diverse in pedestrian activity, traffic patterns and community character, the corridor has been broken into four segments:

- Segment 1 – Highway 101 to El Camino Real
- Segment 2 – El Camino Real to South Road
- Segment 3 – South Road to Alameda de las Pulgas
- Segment 4 – Alameda de las Pulgas to Highway 92

By breaking the corridor into smaller segments, the project team was able to focus on the specific issues within each area. As the project progressed, the concepts developed for each area were blended to create a draft conceptual plan for improving access and mobility along the entire corridor.

Analysis

City staff in conjunction with the consultants held four public workshops to receive input from the residents, business owners, schools, community members and various stakeholders. These meetings were held on:

- April 18, 2013: Community Workshop and Open House – Defining the Vision
- September 18, 2013: Community Workshop and Open House – Preliminary Design Concepts
- February 20, 2014: Community Workshop and Open House – Draft Conceptual Improvements
- May 21, 2014: Open House - Gathering additional feedback on the recommended conceptual improvements.

In addition, City staff made a presentation to the Parks and Recreation Commission on April 2, 2014 to gather input on any potential bicycle/pedestrian improvements in the park, a City Council Study Session was held on April 8, 2014, to discuss the Ralston Avenue Corridor Conceptual Study Improvements, and a presentation was made to the Notre Dame de Namur University Board of Trustee Infrastructure Committee on June 17, 2014.

Throughout the Corridor Study process, Staff has maintained a project webpage to keep stakeholders informed and engaged in the planning process (<http://www.RalstonAvenueCorridorStudy.org>). Reports, technical memos, alternative plans, and the numerous workshops' presentation material were posted on the project webpage as they became available.

The Ralston Avenue Corridor Study and Improvements Plan (Plan) serves as the conclusion to the study and provides a summary of the planning initiative as well as recommendations for conceptual context sensitive design alternatives. The next steps in advancing this corridor context sensitive plan forward is to prioritize the improvements, prepare pre-design plans, specifications and estimates, and identify/secure funding sources to construct the improvements. The funding goal can be achieved by either securing a grant that will cover all the improvements or by prioritizing the improvements based on various criteria and obtain funding for each of them.

To date City staff has applied for two Active Transportation Grants in the amount of approximately \$8 Million each to compete the work identified in the Plan. Additional funding options are summarized in Appendix C (Implementation and Funding) of the Plan. Upon Council approval of the Plan, staff will bring back a consultant amendment for the Phase III of the project which will include developing final alternatives, short term and long term preliminary design development plans for programming of the capital improvement projects, associated budgets and funding strategies.

Approval of this plan does not approve funding for any of the individual projects summarized here. Staff will bring funding requests, together with a more detailed project description and environmental analysis, to the Council for individual projects at a later date.

Alternatives

1. Take No Action
2. Refer back to staff for more information

Attachments

A. Resolution

Fiscal Impact

- ☒ No Impact/Not Applicable
☐ Funding Source Confirmed:

Source:

- ☒ Council
☒ Staff
☐ Citizen Initiated
☐ Other*

Purpose:

- ☐ Statutory/Contractual Requirement
☒ Council Vision/Priority
☐ Discretionary Action
☐ Plan Implementation*

Public Outreach:

- ☒ Posting of Agenda
☒ Other*

*Posting on Belmont website, project website, social media, and sending emails to individual stakeholders.

RESOLUTION NO. 2014-

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BELMONT ADOPTING THE RALSTON AVENUE CORRIDOR STUDY AND IMPROVEMENTS PLAN AS A CORRIDOR CONTEXT SENSITIVE PLAN

WHEREAS, the Ralston Avenue Corridor Study and Improvements Project is a Council Priority project; and,

WHEREAS, the Ralston Avenue Corridor Study and Improvements Project formally began in 2013 and included an analysis of existing conditions, identification of issues and opportunities, a series of public outreach events, the development of design parameters and creation of conceptual context sensitive design alternatives; and,

WHEREAS, the Ralston Avenue Corridor Study and Improvements Plan (Plan) serves as the conclusion to the study and provides a summary of the planning initiative, as well as recommendations for conceptual context sensitive design alternatives; and,

WHEREAS, the Plan establishes a context sensitive vision for the short and long-term planning of Ralston Avenue through Belmont; and,

WHEREAS, it is in the best interest of the citizens of the City of Belmont that the Plan be adopted by the City Council as a Corridor Context Sensitive Plan to provide a framework for the future operational and infrastructure improvements of the Ralston Avenue Corridor through Belmont.

NOW, THEREFORE, the City Council of the City of Belmont resolves as follows:

SECTION 1. Adopts the Ralston Avenue Corridor Study and Improvements Plan as a Corridor Context Sensitive Plan, as depicted in Exhibit A.

* * *

ADOPTED August 26, 2014, by the City of Belmont City Council by the following vote:

Ayes:

Noes:

Absent:

Abstain:

ATTEST:

City Clerk

Mayor

APPROVED AS TO FORM:

City Attorney



The Ralston Avenue Corridor Study and Improvements Plan

August 2014



w-trans



alta
PLANNING + DESIGN

ITERIS
Innovation
for better mobility

RED3

Acknowledgements

Belmont City Council

- Warren Lieberman, Mayor
- David Braunstein, Vice-Mayor
- Cathy Wright
- Eric Reed
- Charles Stone

Belmont Public Works

- Afshin Oskoui, P.E., Public Works Director
- Leticia Alvarez, P.E., Assistant Public Works Director/City Engineer
- Bozhena Palatnik, P.E., Associate Civil Engineer

Consulting Team

- Mark Spencer, PE, W-Trans
- Steve Weinberger, PE PTOE, W-Trans
- Tony Henderson, PE PTOE, W-Trans
- Jennifer Donlon Wyant, Alta Planning + Design
- Rich Shinn, Iteris, Inc.
- Ray Davis, RED3

Table of Contents

1. Introduction	1
2. Recommendation Summary	2
3. Recommended Improvements Toolbox Overview.....	3
4. Segment 1: US 101 to El Camino Real	4
4.1 Background, Challenges and Recommended Improvements	4
4.2 Segment 1: US 101 to El Camino Real Conceptual Improvement Map	6
4.3 Benefits and Consequences.....	7
4.4 Summary of Costs	7
5. Segment 2: El Camino Real to South Road	8
5.1 Background, Challenges, Recommended Improvements	8
5.2 Segment 2: El Camino Real to South Road Conceptual Improvement Map	10
5.3 Benefits and Consequences.....	11
5.4 Summary of Costs	11
6. Segment 3: South Road to Alameda de las Pulgas	12
6.1 Background, Challenges, Recommended Improvements	12
6.2 Segment 3: South Road to Alameda de las Pulgas Conceptual Improvement Map ...	15
6.3 Benefits and Consequences.....	16
6.4 Summary of Costs	17
7. Segment 4: Alameda de las Pulgas to SR 92	18
7.1 Background, Challenges, Recommended Improvements	18
7.2 Segment 4: Alameda de las Pulgas to SR 92 Conceptual Improvement Map (1 of 3) .	21
7.3 Segment 4: Alameda de las Pulgas to SR 92 Conceptual Improvement Map (2 of 3) .	22
7.4 Segment 4: Alameda de las Pulgas to SR 92 Conceptual Improvement Map (3 of 3) .	23
7.5 Benefits and Consequences.....	24
7.6 Summary of Costs	25
Appendix A: Methodologies	26
Appendix B: Frequently Asked Questions	27
Appendix C: Planning for Implementation and Funding.....	29

1. Introduction

The City of Belmont recognizes the importance of Ralston Avenue as a key community corridor. The corridor includes homes, neighborhood serving retail, schools, and a Caltrain Station. The corridor is also connected with US 101 and SR 92 and can experience high traffic volumes.

The goals of the Ralston Avenue Corridor Study Project are two-fold:

- 1. Determine the adequacy of the corridor for multi-modal use by evaluating the ability to accommodate pedestrians, bicyclists, transit riders and motorists under existing and projected future conditions.
- 2. Develop context sensitive transportation alternatives to improve conditions for all users along the corridor.

This report presents context sensitive alternatives for improving multi-modal connectivity along the corridor, and is the culmination of three formative working papers that were produced as part of this effort:

- The first document summarized data collected for the project;
- The second document was an analysis of existing operations along the corridor; and
- The third document was a corridor alternatives report.

Study Segments

For analysis purposes, Ralston Avenue has been studied in four segments, based land use and environment:

- Segment 1: US 101 to El Camino Real
- Segment 2: El Camino Real to South Road
- Segment 3: South Road to Alameda de las Pulgas
- Segment 4: Alameda de las Pulgas to SR 92

Segment Improvement Components

This Ralston Avenue Corridor Study and Improvements Plan presents each segment improvement in four sections:

Background, Challenges, and Recommended Improvements: This section describes the corridor, the identified travel challenges, and the recommended improvements.

Conceptual Improvement Map: The improvement map illustrates the recommended improvements.

Benefits and Consequences: Each improvement has been weighed based upon its impact to each mode and the benefits and consequences of implementation.

Improvement Costs: This section presents the costs of the recommended improvements.

Community Input

The recommendations presented in this Plan are the result of input from the Belmont community. The recommendations are informed by:

- 1. Information Gathering Public Workshop held on April 18, 2013
- 2. Design Concept Review Community Workshop held on September 18, 2013
- 3. Conceptual Improvements Community Workshop held on February 20, 2014
- 4. City of Belmont Parks and Recreation Commission Meeting held on April 2, 2014
- 5. City of Belmont City Council Study Session and Open House held on April 8, 2014
- 6. Community Open House held on May 21, 2014
- 7. Comments submitted to the project website: www.ralstonavenuecorridorstudy.org
- 8. Comments submitted during stakeholder interviews conducted as part of this project
- 9. Comments submitted to the City as part of ongoing project planning

2. Recommendation Summary

Each segment of the corridor was reviewed for improvement to the walking, bicycling and driving environment with the goal of providing continuous, comfortable and safer facilities. Potential alternatives were presented to the community for review and determination of preference. The following recommendations are the result of that community input. They add mobility options to the corridor without significantly negatively impacting vehicular travel.

Pedestrian Crossing improvements	Sidewalk Improvements	Bikeway Improvements	Signage and Wayfinding	Vehicle Access Improvements	Design and Contingency
Segment 1 US 101 to El Camino Real: \$243,750					
Improved crossing times Improved crossing visibility	Reduce crossing distance	Bikeway improvements	Wayfinding	Signal timing and coordination	
\$107,600	\$1,600	\$36,000	\$1,500	\$16,000	\$81,250
Segment 2 El Camino Real to South Road: \$898,200					
Improved crossing times Improved crossing visibility	Sidewalk widening	El Camino Real path and crossing	Wayfinding	El Camino Real signal timing South Rd traffic signal	
\$145,400	\$93,500	\$111 600	\$3,300	\$245,000	\$299,400
Segment 3 South Road to Alameda de las Pulgas: \$4,988,550					
Improved crossing visibility and protection	Reduce crossing distance	Continuous bike lanes	Wayfinding	Notre Dame de Namur roundabout Notre Dame Avenue traffic signal	
\$143,300	\$1,050,200	\$170,200	\$2,000	\$1,960,000	\$1,662,850
Segment 4 Alameda de las Pulgas to SR 92: \$2,615,700					
Improved crossing visibility	Landscape strip	Improved bikeway visibility	Wayfinding	Tahoe Drive traffic signal	
\$122,300	\$1,132,200	\$59,800	\$4,500	\$425,000	\$871,900
Project Totals: \$ 8,746,200					
\$518,400	\$2,277,500	\$377,600	\$11,300	\$2,646,000	\$2,915,400
Percent of Costs					
9%	39%	6%	<1%	45%	

3. Recommended Improvements Toolbox Overview

The conceptual plans on the following pages include a number of treatments which are described below in greater detail.

3.1 High Visibility Crosswalks

There are a number of different marked crosswalk types, including the high visibility continental style shown at right. These types of crosswalks are more visible to drivers and are generally recommended at locations with high pedestrian activity, where slower pedestrians are expected (such as near schools), and where high numbers of pedestrian related collisions have occurred.

3.2 Advance Stop Lines

Advance stop lines are a painted stripe in the roadway set back from the crosswalk, directing drivers to stop at least 4 feet before the crosswalk. On multi-lane roads advance stop lines increase pedestrian visibility for drivers in other travel lanes, especially important around schools, as students are harder to see than adults. Advance stop lines also discourage encroachment upon the crosswalk at a red light, leaving more free space for pedestrians to cross.

3.3 Community Wayfinding

A wayfinding system consists of comprehensive signing to guide roadway users to their destinations along preferred routes. The system can be supplemented with pavement markings that primarily benefit bicyclists. There are three general types of wayfinding signs: confirmation signs, turn signs and decision signs. Confirmation signs indicate to bicyclists they are on a designated roadway. Turn signs indicate where a route turns from one street onto another. Decision signs mark the junction of two or more routes, and indicate key destinations, distance and direction.

3.4 Pedestrian Refuge Island

Pedestrian refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing. A refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings. If landscaped, the plant material should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 ft. 6 in.

3.5 Rectangular Rapid Flashing Beacons

Rectangular rapid flashing beacons (RRFB) are pedestrian actuated devices mounted adjacent to the roadway. The beacon lights are rectangular LED



High Visibility Crosswalk



Advance Stop Lines



Community Wayfinding

(Example only, actual design to be determined)



Pedestrian Refuge Island



RRFB

lights installed below a pedestrian crosswalk sign that flash in an alternating pattern when activated. The beacon is dark when not activated. Caltrans has received approval from the Federal Highway Administration (FHWA) for use of RRFBs on a blanket basis at uncontrolled pedestrian crosswalk locations in California, including State highways and all local jurisdictions’ roadways.¹

3.6 Cross-Bike Crossing

Cross-bike crossings are crossings that are a combination of a crosswalk and bicycle crossing. Typically, a standard crossing is for pedestrian use only and this treatment is designed to alert drivers that bicyclists should be expected at the crossing. The treatment includes a standard high visibility crosswalk markings with a wide green centerline marked with shared lane markings. This treatment is not a Caltrans approved traffic control device, however the City can apply to Caltrans for approval to experiment.



Cross-Bike Crossing



Roundabout

3.7 Roundabout

Modern roundabouts are relatively new to the United States, though in recent years their use has been growing rapidly as decision makers, the public, and the development community have come to realize their benefits. In general, roundabouts are safer than traditional signalized intersections because there are fewer possible conflict areas within a roundabout, and when collisions do occur, they are likely to be less severe than those at signalized or uncontrolled intersections. Roundabouts can also serve as a traffic calming tool by moderating travel speeds in the vicinity, which can lead to lower fuel consumption and improved air quality. Further, roundabouts can provide an excellent opportunity for landscaping and/or public art, and work well as “gateways” into urban areas that visually alert drivers as they enter a different type of street environment.

3.8 Congestion Relief

There are several programs underway that will provide congestion relief along Ralston Avenue, El Camino Real, and the area in general. The San Mateo Smart Corridor Program was initiated by the City/County Association of Governments of San Mateo (C/CAG) in association with Caltrans District 4, the San Mateo County Transportation Authority (SMCTA), and the participating local agencies, to address the operation of the US 101 corridor that includes both freeway and local arterials, with the intent of benefiting a variety of users. The overall goal is to improve operations along the US 101 corridor, including the local arterials in Belmont, to better accommodate the influx of traffic that diverts off of US 101 onto the local arterials during times of recurring and non-recurring congestion on US 101. As a stakeholder in the San Mateo Smart Corridor Program, the City of Belmont will receive a new central traffic signal control system for intersections located in the Smart Corridor project area, which includes signalized intersection between US 101 and Alameda de las Pulgas.

The Metropolitan Transportation Commission (MTC) administers the Program for Arterial System Synchronization (PASS). The PASS program provides technical assistance to Bay Area agencies to help improve the safe and efficient operation of their traffic signal systems and corridors. MTC has allocated a grant to the City of Belmont under the PASS program that will provide updated traffic signal timing plans at 12 intersections along Ralston Avenue between US 101 and Christian Drive. The goals of the PASS program include air quality improvements through decreased motor vehicle emissions and fuel consumption, improved reliability and predictability of travel along arterials, and improvement to safety of motorists, pedestrians, and bicyclists.

¹ Approval number IA-11-83-RRBF-California Statewide.

4. Segment 1: US 101 to El Camino Real

4.1 Background, Challenges and Recommended Improvements

4.1.1 Background

This easternmost segment of Ralston Avenue in the City of Belmont is between US 101 and El Camino Real. Ralston Avenue is wider in this segment compared to the other study segments. This segment serves as a transition between the core downtown area of Belmont and office buildings located in Redwood Shores to the east.

Land Use and Connectivity

Generally land uses along this segment are commercial with connections to nearby residential areas. Segment 1 includes a number of important destinations that require consideration for pedestrian, bicycle, and vehicle connectivity. These include:

- US 101
- US 101 bicycle and pedestrian overcrossing
- Nesbit Elementary School
- Post Office
- Retail
- Belmont Caltrain Station

Connectivity challenges are described below in greater detail.

4.1.2 Segment Challenges and Goals

Pedestrian Travel

Segment 1 includes a complete sidewalk network however it was found to be in need of some pedestrian crossing enhancements to connect the neighborhoods to the south with the retail and Nesbit Elementary on the north side of Ralston Avenue.

Pedestrian related challenges include:

- Pedestrians using unmarked crossings
- Missing curb ramps
- Narrow sidewalks
- Insufficient pedestrian crossing times at signalized intersections
- Reported driver non-compliance with the “No Right Turn” illuminated sign at Hiller Street
- Reported low driver yield rates at the Elmer Street pedestrian crossing; The existing crossing is wide and consists of five travel lanes

The pedestrian improvement goals along this segment are to improve crossing visibility, improve crossing safety, and provide adequate crossing times.



It was reported that drivers do not comply with this illuminated sign at Hiller Street.



It was reported that drivers do not always yield to pedestrians at this uncontrolled crossing at Elmer Street

Bicycle Travel

The challenge related to bicycle travel in this segment of Ralston Avenue is the lack of bicycle facilities on Ralston; however there are a number of destinations including Downtown Belmont, Belmont Caltrain Station, Post Office, Nesbit Elementary School and the US 101 pedestrian and bicycle overcrossing.

Specific challenges include:

- No on-street bicycle space
- US 101 overcrossing does not have bicycle facilities
- Reported driver non-compliance with the “No Right Turn” illuminated sign at Hiller Street
- Wayfinding from westbound US 101 pedestrian and bicycle overcrossing does not continue past the intersection of Hiller Street and Ralston Avenue
- It is difficult to access the US 101 pedestrian and bicycle overcrossing for eastbound bicyclists
- The Caltrain undercrossing is challenging because of high vehicle volume and speed

The bicycle improvement goals were to provide dedicated bicycle space either on or adjacent to Ralston Avenue. The former requires the elimination of parking in order to accommodate the bike lanes while maintaining the existing travel lanes. There are existing bike lanes on Masonic Way, one block to the north of Ralston Avenue and an alternative was created which utilizes this corridor with additional connectivity elements. Another bicycle related goal for this segment is to increase visibility for bikeways at the freeway ramps.

Vehicle Travel

Ralston Avenue is the primary vehicle traffic carrier to the US 101 interchange. The vehicular challenge in Segment 1 is capacity and timing. Because of its importance to circulation between US 101 and El Camino Real and the need to maintain vehicle capacity, no changes to travel lanes were considered.



Ralston Avenue is a well-used corridor



A bicyclist crosses Ralston Avenue at Old County Road

4.1.3 Preferred Conceptual Improvements

Pedestrian Travel Improvements

The pedestrian travel improvements along this corridor focus on providing sufficient crossing times at signalized intersections and improved crossing visibility.

Ralston Avenue at Hiller Street: It is recommended that traffic signal timing at Ralston Avenue/Hiller Street could be modified to increase pedestrian crossing times giving slower pedestrians more time to complete their crossing. Depending on traffic demand, the longer pedestrian crossing time may result in a slight increase in intersection delay, but only at times when the pedestrian phase is activated. Additionally, the crosswalk crossing Ralston Avenue would be upgraded with high-visibility markings.

Ralston Avenue at Elmer Street: The currently uncontrolled pedestrian crossing of Ralston Avenue at Elmer Street is recommended to be upgraded to include a HAWK, curb extensions, high visibility pavement markings and a center median pedestrian refuge area coupled with advanced warning signs. The improved markings would increase the visibility of pedestrians crossing the street which is further improved with the HAWK beacon that has been demonstrated to increase driver compliance at crosswalks.

Ralston Avenue at Old County Road: It is recommended that all crosswalks at this intersection be upgraded with high-visibility crosswalks to improve visibility.

Accessibility: Wherever physical improvements are made to a pedestrian crossing, it may be necessary to upgrade curb ramps to meet standards set in the Americans with Disabilities Act (ADA). Additionally, other crossing locations could be upgraded to meet current ADA standards to provide enhanced access for persons with mobility impairments.

Bicycle Travel Improvements

Bicyclists can be directed to use Masonic Way as an alternate route to the western segments of Ralston Avenue and Caltrain. Masonic Way has significantly lower traffic volumes and speeds than Ralston Avenue. This alternative would include installation of enhanced way-finding signs, connections with proposed pathways and enhanced crossings.

US 101 Ramps: Green bike lanes are recommended at the US 101 ramps to delineate the bicycle travel path and alter drivers to expect bicyclists.

Masonic Way: Dedicated bicycle space on Ralston Avenue in Segment 1 would require the removal of on-street parking which was not a community preferred choice. This Plan includes the recommendation to direct bicyclists to Masonic Way. Masonic Way has significantly lower traffic volumes and speeds than Ralston Avenue, making the route more comfortable for bicyclists. The existing bike lanes on Ralston Avenue place bicyclists in the ‘door zone.’ It is recommended that the City consider traffic calming and space re-allocation on Masonic Way, or as an option a Bicycle Boulevard



High Visibility Crosswalk



HAWK Beacon



Green Bike Lanes



Wayfinding
(Example only, actual design to be determined)

concept on Masonic Way could be considered.

Old County Road: A bicycle path is recommended between Masonic Way and Ralston Avenue on the west side of Old County Road. This path will facilitate bicycle access to Caltrain, Masonic Way, Ralston Avenue and the bikeway project on Old County Road south of Ralston Avenue.

Ralston Avenue between Old Country Road and El Camino Real: Cross-bike markings are recommended where bicyclists cross from the paths to crosswalks at both intersections. Additionally, it is recommended that dedicated bicycle space be provided under the Caltrain overpass.

Ralston Avenue at El Camino Real: One-way off-street bicycle paths are recommended along both sides of Ralston Avenue between El Camino Real and Old County Road (under the Caltrain underpass). Since the width of Ralston Avenue is constrained within this section, the off-street bicycle paths provide bicyclists with an option to ride outside of the travel lanes. Since these paths would be designed as one-way, it would minimize the chance of conflict between two bicyclists; however, the paths would be shared with bi-directional pedestrian traffic, creating a potential for conflicts between bicyclists and pedestrians. Additional intersection ramp improvements would be necessary to facilitate the transition between on-street and off-street bicycle facilities.

Ralston Avenue/ Hiller Street: Ralston Ave (minor) and Hiller Street are recommended to include ‘Bikes May Use Full Lane’ signs, and shared lane markings. To improve operations for bicyclists traveling northbound on Hiller Street, a bicycle loop detector should be added. This will allow bicyclist to trigger a ‘green’-phase at the existing signal.

Entire Segment Improvements: It is recommended the entire segment include installation of enhanced community/bicycle way-finding signs.

Vehicle Travel Improvements

Ralston Avenue at Old County Road: It is recommended the traffic signal at Ralston Avenue and Old County Road be coordinated and enhanced with the San Mateo Smart Corridor Program.

The PASS program: Will provide updated traffic signal timing plans along Ralston Avenue at US 101northbound ramps, US 101 southbound ramps, Hiller Street, Old County Road, and El Camino Real.

4.1.4 Consequences of Preferred Improvements

This segment improvement recommendation would not modify any pedestrian or transit services facilities and therefore would have no negative impact on pedestrian connectivity or transit access.

In general, the bicycling community shared that it would prefer a route on the lower volume and lower speed Masonic Way, with the safety and comfort further enhanced by the designation of Class II bicycle lanes. However, depending on the bicyclist’s origin and destination, this may be an overall longer route; therefore, some bicyclists may choose to continue riding on Ralston Avenue without the benefit of designated bicycle facilities.

It is expected that the recommended projects on this segment would have a negligible impact on vehicle traffic. Use of the enhanced bicycle crossing facilities at Ralston Avenue/El Camino Real and Ralston Avenue/Old County Road may result in a slight increase in vehicle delay at these intersections while bicyclists are crossing the street, but impacts to overall average delay are expected to be minimal. See Table 4-1for further details.

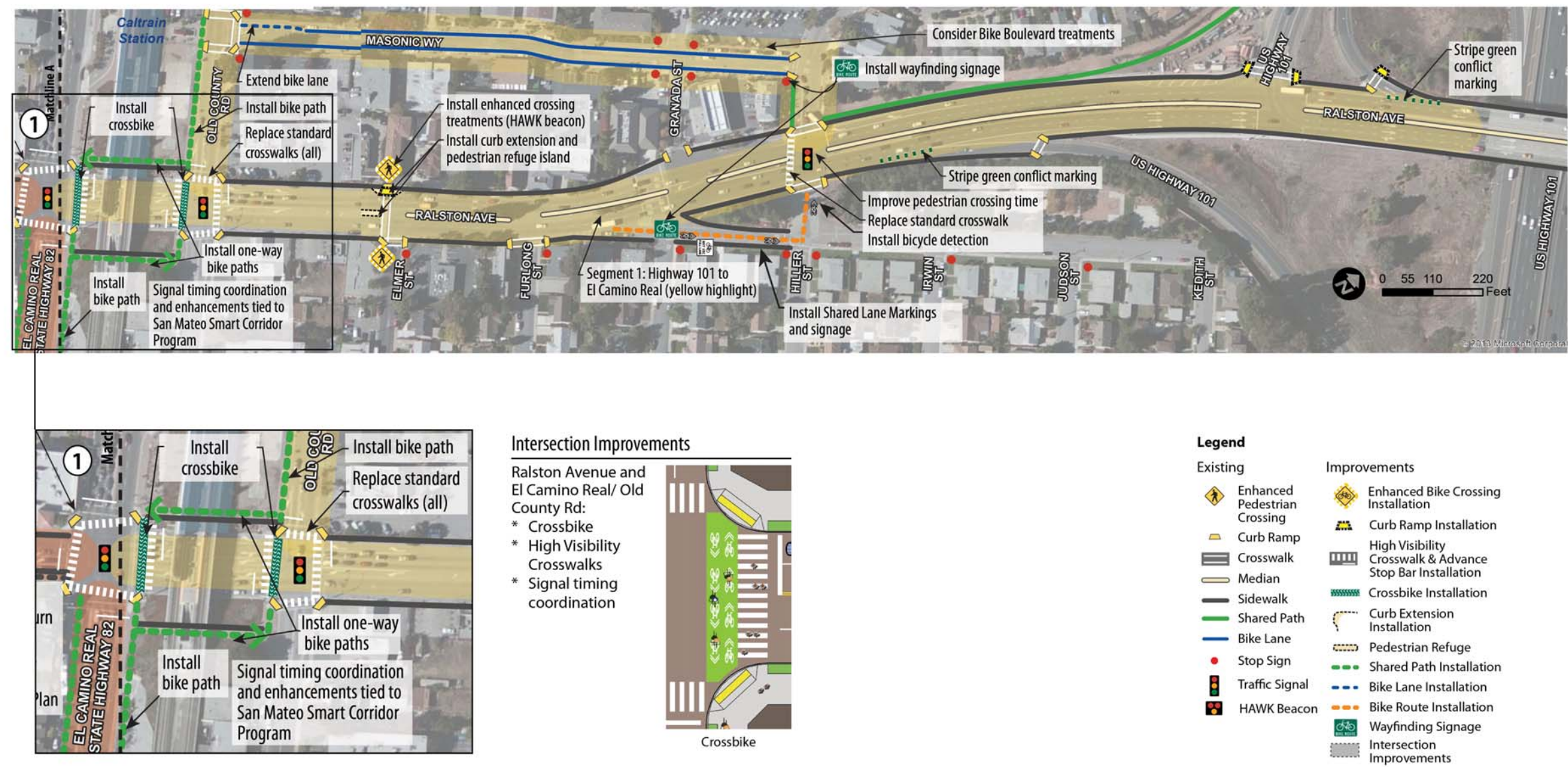


Cross-Bike Crossing



Proposed bicycle circulation around Old County Road, El Camino Real, and the Caltrain crossing

4.2 Segment 1: US 101 to El Camino Real Conceptual Improvement Map



4.3 Benefits and Consequences

Each improvement has been weighed based upon its impact to each mode and the benefits and consequences of implementation.

Table 4-1: Segment 1 Benefits and Consequences

Improvement	Auto	Bike	Pedestrian	Transit	ROW	Benefits	Consequences
Increased pedestrian crossing times and install high-visibility markings at Ralston Ave/Hiller St	-	o	+	-	o	<ul style="list-style-type: none">Added time to allow pedestrians to cross the streetIncreases pedestrian visibility	<ul style="list-style-type: none">Increase in average vehicle delay at the intersection
Enhanced pedestrian crossing at Ralston Ave/Elmer St, including HAWK beacon, refuge island and curb extensions	o	o	+	-	-	<ul style="list-style-type: none">Negligible impact to vehicle trafficIncreased pedestrian crossing visibilityImproves connectivity to transit serviceWhen activated by a pedestrian, HAWK signals generally improve driver crosswalk compliance	<ul style="list-style-type: none">There may be instances where drivers need to come to a complete stop even if a pedestrian is not in the crosswalkMay require limited right of way acquisition
Provide 'Bikes May Use Full Lane' signs on Ralston Avenue (minor) and Hiller Street, shared lane markings, and bike detection at signal	o	+	o	o	o	<ul style="list-style-type: none">Discourages motorists from unsafe passing of bicyclistsIndicates to bicyclists to use the full travel lane to operate	<ul style="list-style-type: none">None
Upgrade the following sections to have ADA-compliant curb ramps: <ul style="list-style-type: none">Ralston Ave/US 101 SB RampsRalston Ave/Furlong StRalston Ave/Elmer St	o	o	+	o	o	<ul style="list-style-type: none">Provide enhanced access for persons with mobility impairments	<ul style="list-style-type: none">None
Designate an alternative bicycle route on Masonic Way with no change to Ralston Ave	o	+	o	o	o	<ul style="list-style-type: none">No change to vehicle travel timesImproves bicycle connectivityPrimary bicycle facility would be located on a roadway with lower traffic volumes and speeds than Ralston AveLimited need for additional right-of-wayEnhanced crossing facilities to facilitate bicyclists who need to cross Ralston Ave to reach Masonic Way	<ul style="list-style-type: none">May increase bicycle travel distanceRequires eastbound-travelling bicyclists to cross Ralston Ave

Improvement	Auto	Bike	Pedestrian	Transit	ROW	Benefits	Consequences
One-way off-street bicycle paths under the Caltrain overcrossing (between El Camino Real and Old County Rd)	o	+	-	o	o	<ul style="list-style-type: none">Provides bicyclists with an option to ride outside of the travel lanes	<ul style="list-style-type: none">Potential for conflicts between bicyclists and pedestrians
Green bicycle lanes on Ralston Ave where bicycle lanes cross the US 101 ramps	o	+	o	o	o	<ul style="list-style-type: none">Improves visibility and safety of bicycle lanes in conflict-prone areas	<ul style="list-style-type: none">None
PASS Program Traffic Signal Timing Plans at US 101 northbound and southbound ramps, Hiller Street, Old County Road and El Camino Real	+	+	+	+	o	<ul style="list-style-type: none">Improves air quality, travel time reliability, and safety for all users	<ul style="list-style-type: none">None

Note: + indicates a positive impact; - indicates a negative impact, o indicates no impact

4.4 Summary of Costs

It is estimated that implementation Segment 1 improvements would cost approximately \$243,750

It is likely that the Ralston Avenue Corridor Study and Improvements Plan could be implemented without the acquisition of additional right-of-way, with the exception of the shared use facility along Old County Road and at the cross-bike locations depending on adjacent facilities. Cost estimates for right-of-way acquisition are not included in this cost estimate.

Table 4-2: Estimated Segment 1 Summary of Costs

Improvement Type	Cost Estimates
Pedestrian Crossing Improvement	\$107,400
Sidewalk Improvements	\$1,600
Bikeway Improvements	\$36,000
Signage and Wayfinding	\$1,500
Vehicle Access Enhancements	\$16,000
Sub-Total	\$162,500
Design	\$40,625
Contingency	\$40,625
Total	\$243,750

5. Segment 2: El Camino Real to South Road

5.1 Background, Challenges, Recommended Improvements

5.1.1 Background

The segment of Ralston Avenue between El Camino Real and South Road encompasses the core of downtown Belmont and includes connectivity to El Camino Real and the Belmont Caltrain Station, both of which are regional transportation routes for north-south travel along the San Francisco Peninsula. The westernmost portion of this segment serves as a transition between the downtown core area and Notre Dame de Namur University and residential areas to the west.

Land Use and Connectivity

Land uses along this segment of Ralston Avenue include commercial and community-serving retail and services, recreation and multi-family housing.

Segment 2 includes key destinations that require consideration for pedestrian, bicycle and vehicle connectivity including:

- Downtown retail
- Twin Pines Park
- Twin Pines Senior and Community Center
- Central Elementary School

Connectivity challenges are described below in greater detail.

5.1.2 Segment Challenges and Goals

Pedestrian Travel

Segment 2 includes a complete sidewalk network; however, the community identified a need for the following pedestrian improvements.

Pedestrian related challenges include:

- Pedestrians using unmarked crossings
- Missing curb ramps
- Narrow sidewalks
- Insufficient pedestrian crossing times at signalized intersections
- South Road intersection requires pedestrians to cross four travel lanes at a high volume stop-controlled intersection

The pedestrian improvement goals along this segment are to improve crossing visibility, improve crossing safety, and provide adequate crossing times. The Village Project in Belmont will consider a 1,000 feet pedestrian corridor that connects downtown Belmont to Ralston Avenue. Refinements to the pedestrian linkages at 6th Street, 5th Street, Emmett Avenue, and elsewhere will be formulated through the Village project planning effort.



Ralston Avenue near 6th Avenue



Ralston Avenue at South Road

Bicycle Travel

Segment 2 does not include dedicated bicycle space along Ralston Avenue. While there are Shared Lane Markings (see image to the right) stenciled on-street, the speed and volume of cars makes it an uncomfortable bicycling environment for most community members. Many bicyclists choose to bicycle on the sidewalk rather than on-street.

Specific challenges include:

- No on-street bicycle space

The bicycle improvement goals were to provide dedicated bicycle space either on or adjacent to Ralston Avenue. This would be made possible by the elimination of one travel lane in each direction. Another option includes the creation of a bike route corridor along Emmett Avenue with connections through Twin Pines Park on the west and a multi-use path paralleling El Camino Real to the east.

Vehicle Travel

The section between El Camino Real and 6th Avenue includes several driveways on both sides of Ralston Avenue. Vehicles turning left to and from these driveways cause conflicts with vehicle queuing at the ECR traffic signal, especially those vehicles waiting to make an eastbound left-turn movement.

The majority of this section is served by multiple travel lanes. However, the all-way stop-controlled intersection at South Road causes significant queuing.

Ralston Avenue is the primary vehicle traffic carrier to El Camino Real, Old County Road, and the US 101 interchange. The vehicular challenge in Segment 2 is capacity and timing. Because of its importance to circulation and the need to maintain vehicle capacity, no changes to travel lanes were considered.



Ralston Avenue near 6th Avenue



Ralston Avenue at El Camino Real

5.1.3 Preferred Conceptual Improvements

Pedestrian Travel Improvements

The pedestrian travel improvements along this corridor focus on providing sufficient crossing times at signalized intersections, improved crossing visibility and sidewalk widening.

Ralston Avenue at El Camino Real: It is recommended that traffic signal timing be modified to increase pedestrian crossing times giving slower pedestrians more time to complete their crossing. Depending on traffic demand, the longer pedestrian crossing time may result in a slight increase in intersection delay, but only at times when the pedestrian phase is activated. Additionally, all crosswalks would be upgraded with high-visibility markings.

Ralston Avenue between El Camino Real and 6th Avenue: It is recommended that on-street parking be removed on the south side of the street in order to widen the sidewalk. Widening of the sidewalk will increase pedestrian flow and comfort and contribute to the placemaking of Downtown Belmont.

Ralston Avenue at 6th Avenue: It is recommended all existing crosswalks at this intersection be upgraded with high visibility-crosswalks to improve visibility.

Ralston Avenue at South Road: It is recommended all existing crosswalks at this intersection be upgraded with high visibility-crosswalks to improve visibility.

Emmett Avenue at 6th Avenue: It is recommended all existing crosswalks at this intersection be upgraded with high visibility-crosswalks to improve visibility and yield lines to discourage crosswalk encroachment. A median at both crossings of 6th Avenue will provide refuge. This treatment will require the re-location of a number of existing mailboxes.

Bicycle Travel Improvements

Bicyclists could be directed to Emmett Avenue as an alternative route to riding on Ralston Avenue, which has significantly lower traffic volumes and speeds than Ralston Avenue. This alternative would include installation of enhanced wayfinding signs, connections with nearby paths and enhanced crossing facilities at El Camino Real and Ralston Avenue.

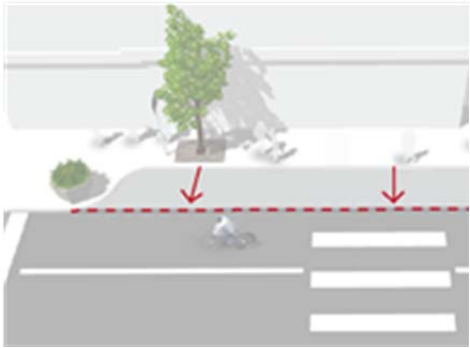
El Camino Real: A bicycle path is recommended between Ralston Avenue and Emmett Avenue on the east side of El Camino Real. This path will facilitate bicycle access to Emmett Avenue, Old County Road, and Caltrain. The City of Belmont will need to work with Caltrans on this crossing, and implementation will be dependent on Caltrans approvals and permitting. Alternately, a cycle track could be installed on the west side of El Camino Real between Ralston Avenue and Emmett Avenue. With this option, the following recommended HAWK signal would be unnecessary.

El Camino Real at Emmett Avenue: It is recommended that an enhanced bicycle crossing with a HAWK signal, pedestrian refuge, high-visibility crosswalks and yield lines be installed at this crossing. These enhanced treatments will facilitate yielding compliance.

Emmett Avenue: Emmett Avenue has lower vehicle volumes and speeds than Ralston Avenue and was identified as a preferred route. It is recommended it include Shared Lane Markings and Bike Route signage.



High Visibility Crosswalk



Widen Sidewalk



HAWK Beacon



Cross-Bike Crossing

Emmett Avenue at 6th Avenue: It is recommended that cross-bike markings be provided for east and west travel on Emmett Avenue across 6th Avenue to improve visibility.

Ralston Avenue South Road to Twin Pines Lane: Bike lanes along this segment will connect bicyclists to existing bike lanes west of this segment and east to the Twin Pines Lane enhanced crossing.

Connection through Twin Pines Park: A pathway parallel to Ralston Avenue can be created in Twin Pines Park that connects South Road to the parking lot in Twin Pines Park, avoiding a connection to the exisitng multi-use path in the park near the picnic and playground araeas. This would allow pedestrians and bicyclists to cross South Road at the new traffic signal and enter the park at this location.

Vehicle Travel Improvements

Ralston Avenue at El Camino Real: It is recommended the traffic signal at Ralston Avenue and El Camino Real be coordinated and enhanced with the San Mateo Smart Corridor Program.

Ralston Avenue between ECR and 6th Avenue: Install a raised median in the mid-block area to prohibit left-turn movements into and out of the northern driveway, west of USA Bank, and the southern driveway on the opposite side of the street. Left-turn movements into the Walgreens driveway could still be maintained. As an option, the two-way left-turn lane could be removed entirely, with traffic directed to access parking lots from side streets.

Ralston Avenue at South Road: The existing all-way stop-controlled intersection at Ralston Avenue/South Road is a common source of congestion that affects traffic along the Ralston Avenue corridor. This intersection is recommended to be upgraded to traffic signal control, which would improve overall intersection operations from Level of Service (LOS) F to LOS A under existing traffic volumes.

Also considered was installation of a modern roundabout at this location; however, due to topographic and right-of-way constraints, it was determined that a modern roundabout would not be practical for this intersection. A mini-roundabout would also not be recommended at this location due to the volume of traffic passing through.

Ralston Avenue westbound merge at South Road: The merging of lanes that is currently just west of South Road should be moved to the east side of the intersection, after the installation of the traffic signal at South Road. This will facilitate the extension of the westbound bicycle lane on Ralston Avenue through the intersection.

The PASS program: Will provide updated traffic signal timing plans along Ralston Avenue at 6th Avenue.

5.1.4 Consequences of Preferred Improvements

It is expected that the recommendations would have a negligible impact on vehicle traffic. Use of the enhanced crossing facilities on El Camino Real may result in a slight increase in vehicle delay while bicyclists are crossing the street, but impacts to overall average delay are expected to be minimal.

The lower traffic volume and speeds on Emmett Avenue would make it a safer and more comfortable route for bicyclists than Ralston Avenue. However, choice of this route may result in a slightly longer travel distance for some bicyclists along with the need to cross Ralston Avenue and/or El Camino Real. Because of this some bicyclists may choose to continue riding on Ralston Avenue without the benefit of designated bicycle facilities, which would be no change from existing conditions.

Removal of on-street parking on the south side of Ralston Avenue between El Camino and 6th Avenue will improve the pedestrian experience and encourage more activity however; there will be a loss of on-street parking.

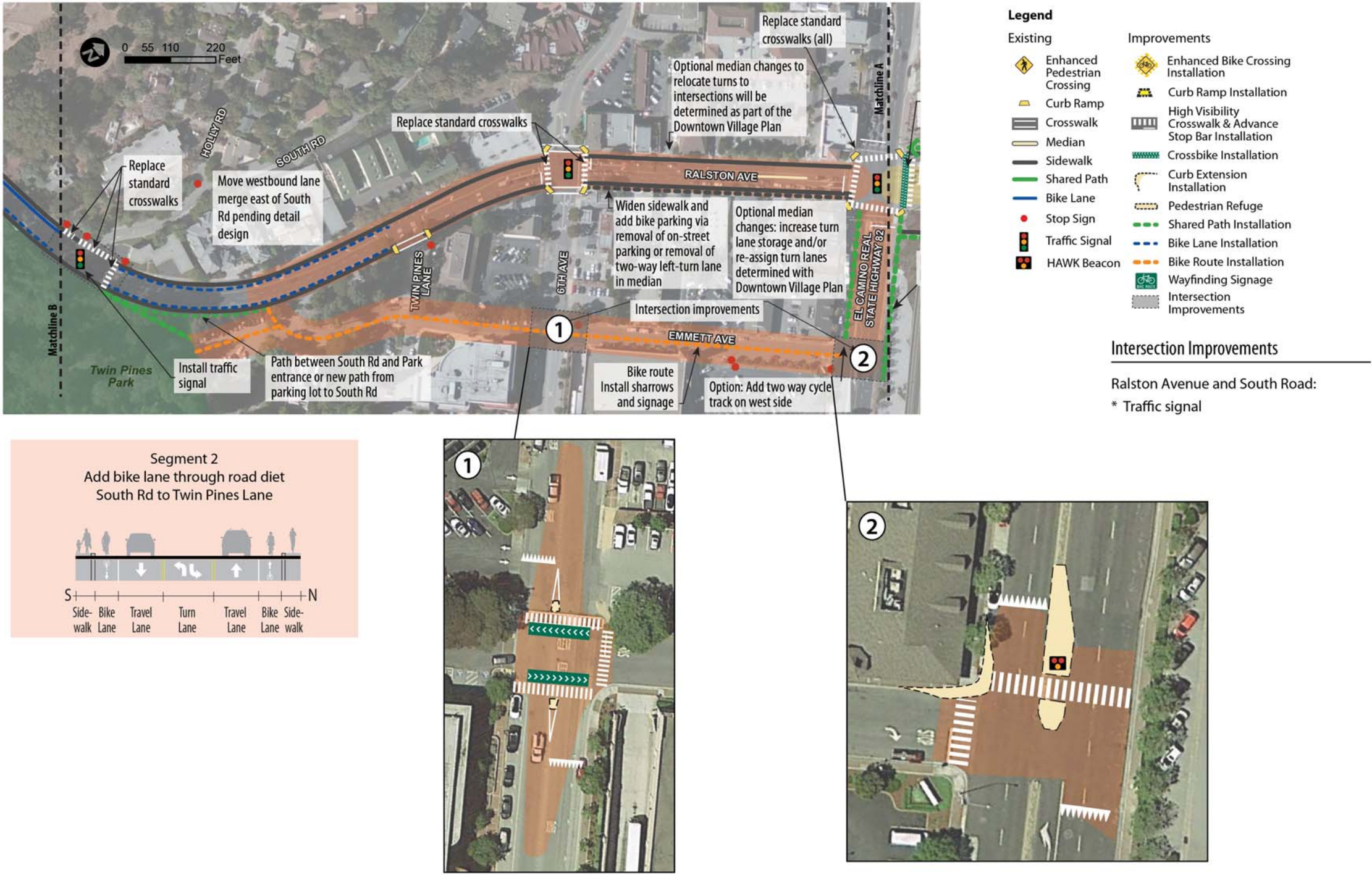
This alternative would not modify any transit services facilities and therefore would have no impact on transit access.

See Table 5-1 for further details.



Community Wayfinding
(Example only, actual
desian to be determined)

5.2 Segment 2: El Camino Real to South Road Conceptual Improvement Map



5.3 Benefits and Consequences

Each improvement has been weighed based upon its impact to each mode and the benefits and consequences of implementation.

Table 5-1: Segment 2 Benefits and Consequences

Improvement	Auto	Bike	Pedestrian	Transit	ROW	Benefits	Consequences
Designate an alternative bicycle route on Emmett Ave while retaining existing configuration on Ralston Ave	o	+	o	o	o	<ul style="list-style-type: none">No change to vehicle travel timesImproves bicycle connectivityPrimary bicycle facility would be located on a roadway with lower traffic volumes and speeds than Ralston AveLimited or no need for additional right-of-wayEnhanced crossing facilities to facilitate bicyclists who need to cross Ralston Ave and/or El Camino Real to reach Emmett Ave	<ul style="list-style-type: none">Potential increases bicycle travel distanceRequires bicyclists to cross Ralston Ave and/or El Camino Real
Install high visibility crosswalk at Ralston Ave/El Camino Real, Ralston Ave/Sixth Ave, and Ralston Ave/South Rd	o	o	+	o	o	<ul style="list-style-type: none">Increases pedestrian crossing visibilityNegligible impact to vehicular traffic	None
Widen sidewalk on Ralston Ave between El Camino and 6 th Avenue	-	o	+	-	o	<ul style="list-style-type: none">Increases pedestrian flow and comfort	Loss off on-street parking and/or loss of two-way left-turn lane.
Adjust signal timing at Ralston Ave/El Camino Real to provide a leading pedestrian interval (LPI). When actuated, the pedestrian signal head changes to walk for 2-4 seconds prior to a motor vehicle green phase.	-	o	+	-	o	<ul style="list-style-type: none">Gives pedestrians an opportunity to enter the crosswalk before opposing traffic receives a green light, thereby increasing pedestrian visibility	Increases vehicle delay (including transit vehicle delay) when the pedestrian phase is activated
Install a midblock median to prohibit left-turn movements into and out of midblock driveways.	+	o	o	+	o	<ul style="list-style-type: none">Decreases vehicle conflictsIncreases vehicle capacity at adjacent signalized intersectionsIncreases vehicle queuing capacity.	Loss of left-turn access to retail centers (however, could be served by other access points)
PASS Program Traffic Signal Timing Plans at Ralston Avenue and 6th Avenue	+	+	+	+	o	<ul style="list-style-type: none">Improves air quality, travel time reliability, and safety for all users	None

Improvement	Auto	Bike	Pedestrian	Transit	ROW	Benefits	Consequences
Convert South Road to be controlled with a traffic signal	+	+	+	o	o	<ul style="list-style-type: none">Limited or no need for additional right-of-wayPedestrians would benefit from a controlled crossing of Ralston Ave at this locationImproved delay and queuing along Ralston Avenue	None
Move westbound Ralston Avenue merge from west of South Road to east of South Road after traffic signal is installed at South Road	o	+	o	o	o	<ul style="list-style-type: none">Limited or no need for additional right-of-wayBicyclists would benefit from extension of westbound bike lane	None
Path from South Rd into Twin Pines Park to connect to parking lot	o	+	+	o	o	<ul style="list-style-type: none">Pedestrians and bicyclists would benefit from a controlled crossing at South Road and more direct access into Twin Pines Park	Construction of pathway and retaining wall parallel to Ralston Avenue

Note: + indicates a positive impact; - indicates a negative impact, o indicates no impact

5.4 Summary of Costs

It is estimated that implementation Segment 2 improvements would cost approximately \$898,200.

It is likely that this Plan could be implemented without the acquisition of additional right-of-way, with the exception of the shared use facility along El Camino Real and at the cross-bike locations depending on adjacent facilities. Cost estimates for right-of-way acquisition are not included in this cost estimate.

Table 5-2: Estimated Segment 2 Summary of Costs

Improvement Type	Cost Estimates
Pedestrian Crossing Improvement	\$145,400
Sidewalk Improvements	\$93,500
Bikeway Improvements	\$111,600
Signage and Wayfinding	\$3,300
Vehicle Access Improvements	\$245,000
Sub-Total	\$598,800
Design	\$149,700
Contingency	\$149,700
Total	\$898,200

6. Segment 3: South Road to Alameda de las Pulgas

6.1 Background, Challenges, Recommended Improvements

6.1.1 Background

The segment of Ralston Avenue between South Road and Alameda de las Pulgas is the narrowest of the Ralston Avenue study segments, with one lane in each direction plus a center turn lane; however, Ralston Avenue currently transitions to a five-lane roadway (two through lanes plus a center turn lane) near both termini of this segment. Additionally the Notre Dame de Namur University and Notre Dame High School are located along this segment of Ralston Avenue.

Land Use and Connectivity

Land uses along this segment of Ralston Avenue are generally residential along the southern side of the roadway and residential/educational along the northern with neighborhood serving retail at the western end.

Segment 2 includes key destinations that require consideration for pedestrian, bicycle and vehicle connectivity including:

- Notre Dame de Namur University
- Notre Dame High School
- Barrett Park and Community Center
- Carlmont Village District

Connectivity challenges are described below in greater detail.

6.1.2 Segment Challenges and Goals

Pedestrian Travel

Segment 3 includes a number of challenges including an incomplete sidewalk network, narrow sidewalks and limited marked crossings.

Pedestrian related challenges include:

- Missing curb ramps.
- Narrow sidewalk with hill erosion on the north side of Ralston Avenue between South Road and Notre Dame De Namur University.
- Narrow sidewalks in Carlmont Village District despite third highest pedestrian activity area.
- Reported blocked sidewalks near Notre Dame De Namur University during University events.
- Shared bicycle and pedestrian path on the north side of Ralston Avenue in front of Notre Dame High School does not meet Caltrans design standards or NACTO best practices. Stencils indicating travel direction appear to be reversed from typical travel on the right.
- Reported high vehicular speeds between Notre Dame Avenue and



Ralston Avenue west of South Road



Ralston Avenue at Chula Vista Dr



Ralston Avenue at Maywood Drive



Ralston Avenue near Notre Dame de Namur

South Road make crossing at uncontrolled marked crossings challenging.

- Reported low driver yielding rates at the Chula Vista uncontrolled marked crossing.
- Missing signage warning eastbound drivers of Chula Vista crosswalk.
- Low visibility of Chula Vista crosswalk.
- Reported low driver yielding rates at the Villa Avenue and Maywood Drive pedestrian beacons.
- Wide crossing at Maywood Drive.
- Northeast corner of Alameda De Las Pulgas at Ralston Avenue has a wide turning radius and traffic signal pole in pedestrian path.

Bicycle Travel

While this segment has the most complete bicycle network of all four, there are a number of gaps in the network, particularly for westbound travel.

Many bicyclists choose to bicycle on the sidewalk rather than on-street.

Specific challenges include:

- No on-street bike lanes between:
 - Notre Dame de Namur entrance and Notre Dame Avenue (north side)
 - Barrett Park and Maywood Drive (north side)
 - Villa Avenue and Alameda De Las Pulgas (north side)
 - Alameda De Las Pulgas and 460 feet west of Alameda De Las Pulgas (south side)
- Bi-directional shared bicycle and pedestrian path on the north side of Ralston Avenue in front of Notre Dame High School does not meet Caltrans design standards or NACTO best practices.
- Reported vehicular travel speeds make the corridor uncomfortable for bicycling except for the most experienced bicyclists.
- Eastbound vehicular travel lane merge just west of Alameda De Las Pulgas poses positioning challenges for bicyclists.
- No bike parking in Carlmont Village District

The bicycle improvement goals were to provide dedicated bicycle space on Ralston Avenue. This could be made possible by reducing the width of the existing travel lane.

Vehicle Travel

The majority of this section is served by the three-lane section (one travel lane in each direction) with a center turn lane). However, several intersections would benefit from traffic control improvements. The all-way stop-controlled intersection at South Road causes significant queuing. Left-turn access out of the University Entrance and the northbound traffic on Chula Vista Drive both experience excessive delays. Traffic control options have been developed to address these issues.



Bike lane ends just west of South Road.



The bike lane network is incomplete.



The lane merge east of Alameda De Las Pulgas is challenging for bicyclists.

6.1.3 Preferred Conceptual Improvements

Pedestrian Travel Improvements

The pedestrian travel improvements along this corridor focus on providing improved crossing visibility, ADA-compliant curb ramps, and sidewalk improvements. All proposed sidewalks should be a minimum of four-feet wide.

Crosswalk Improvements: The following crossings of Ralston Avenue could be upgraded to include high visibility markings:

- Ralston Avenue/South Road
- Notre Dame Avenue
- Misty Lane-Avon Street
- Alameda de las Pulgas

Ralston Avenue between South Road and Alameda de las Pulgas: In segments where sidewalks currently exist, on both sides of Ralston Avenue, there is a need for rehabilitation of the existing sidewalk. This would enhance the pavement quality and provide a uniform width for the existing sidewalk.

Ralston Avenue between South Road and Notre Dame de Namur: A continuous sidewalk is recommended on the north side of Ralston Avenue between South Road and Notre Dame de Namur University. This would require acquisition of additional right-of-way and installation of retaining walls in some locations. The City of Belmont received a One Bay Area Grant from the Metropolitan Transportation Commission. The project consists of a new four-foot wide concrete sidewalk, curb and gutter improvements between South Road and the Notre Dame de Namur University entrance on the north side of Ralston Avenue. Also, new ADA compliant ramps will be constructed near Notre Dame de Namur University. The project goal is to create a safe and continuous pedestrian access along Ralston Avenue between Notre Dame de Namur University and the downtown area, train station and bus stops.

Ralston Avenue at Chula Vista Drive: A high visibility crosswalk with a Rapid Rectangular Flashing Beacon (RRFB) is recommended at this intersection to facilitate increased pedestrian visibility and yield compliance. RRFBs have been demonstrated to significantly increase motorist yield compliance at marked crosswalks.

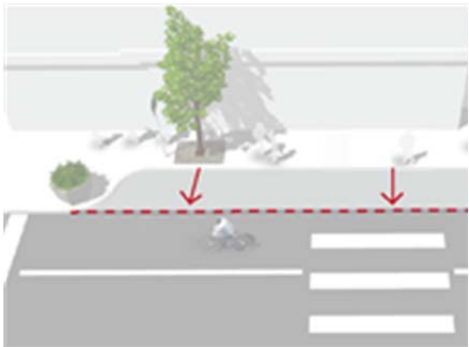
With the development of a roundabout at Ralston Avenue at Notre Dame de Namur University Driveway (see Vehicle Travel Improvements on page 16), it is recommended that a median refuge be provided to allow pedestrians to cross a single direction of travel at a time.

Ralston Avenue at Maywood Drive: It is recommended the existing crosswalk be upgraded to include high visibility markings with curb extensions and a new Rapid Rectangular Flashing Beacon.

Ralston Avenue at Villa Avenue: The existing pedestrian activated flashing sign lights would remain in place, but a refuge area could be created in the existing center landscaped median, allowing pedestrians to cross one leg of Ralston Avenue at a time. Additionally, the crosswalk would be modified to remove the existing bend. Extension of the center median refuge area may require either the prohibition of the southbound left-turn movement from Villa Avenue at this location, or modification of the existing median and curb ramps.



High Visibility Crosswalk



Widen and Improve Sidewalk



Curb Extension



Median Refuge

Accessibility: ADA-compliant curb ramps could be installed at the following locations to enhance access for persons with mobility impairments:

- Ralston Avenue/Notre Dame de Namur University
- Ralston Avenue/Chula Vista Drive
- Ralston Avenue/Notre Dame High School (both entrances)
- Ralston Avenue/Notre Dame Avenue
- Ralston Avenue/Avon Street
- Ralston Avenue/Maywood Drive

Wayfinding: Install enhanced way-finding signs to direct bicycles and pedestrians to the off-street park trail.

Bicycle Travel Improvements

The bicycle travel improvements along this corridor focus on providing improved continuous on-street bicycle facilities. Where recommended, it is feasible to include on-street bike lanes at a minimum of five-feet wide while maintaining a minimum 11-foot vehicle travel lanes.

Ralston Avenue between Twin Pines Park and South Road: The existing westbound bike lane ends just west of the Twin Pines Park path. This Plan recommends installation of bicycle lanes in this sub-segment.

Ralston Avenue between Notre Dame de Namur driveway and Chula Vista Drive: It is recommended a westbound bicycle lane be installed in this sub-segment.

Ralston Avenue between Chula Vista Drive and Notre Dame Avenue: In this sub-segment the parcel extends into the travel way further than in other segments. A non-standard two-way shared use path on the north side of the street serves the school but provides access challenges. It is recommended this path be replaced with a sidewalk and a bicycle lane installed on-street. With the addition of the roundabout at the driveway to Notre Dame High School, a median refuge island should be developed at Chula Vista Drive. This refuge island should include a high visibility marked crossing to provide a more comfortable way across Ralston Avenue for people traveling by foot or by bike. Median refuge islands allow users to cross a single direction of traffic at a time.

Ralston Avenue between Misty Lane and Maywood Drive: In this sub-segment the parcel extends into the travel way further than in other segments. A non-standard two-way shared use path on the north side of the street serves the school but provides access challenges. It is recommended this path be replaced with a sidewalk and a bicycle lane installed on-street.

Ralston Avenue between Academy Avenue and Alameda de las Pulgas: It is recommend that a westbound bicycle lane be installed between Villa Avenue and Alameda de Las Pulgas. Bike lanes for east bound travel cannot be accommodated in this sub-segment so instead it is recommended that Shared Lane Markings be installed.

Vehicle Travel Improvements

Ralston Avenue at Notre Dame de Namur University Driveway: A modern roundabout is proposed for the intersection of Ralston Avenue/Notre Dame de Namur University Driveway. Currently, the intersection is stop-controlled on the southbound Notre Dame de Namur University Driveway approach, and is uncontrolled on the Ralston Avenue approaches.

A single-lane modern roundabout is recommended for installation at this location. In general, installation of the roundabout would reduce delay for vehicles entering and exiting the university driveway, but would increase overall intersection delay as vehicles on Ralston Avenue would slow down as they enter and pass through the roundabout. Thus, installation of a modern roundabout at this intersection would provide traffic calming benefits along Ralston



Bike Lanes



Enhanced Crossing

Avenue by moderating travel speeds. Additionally, a roundabout could serve as a public art or gateway element along Ralston Avenue. In the near-term, installation of a modern roundabout would result in LOS B or C operations under existing traffic volumes. Under projected future traffic the roundabout would operate at LOS F. As noted previously, however, these projections may be overestimating traffic on Ralston Avenue leading to a worse level of service. Installation of this roundabout would result in the need for additional right-of-way.

Installation of a modern roundabout would have a secondary benefit at the intersection of Ralston Avenue/Chula Vista Drive. It was noted during the community outreach efforts for this corridor study that drivers find it difficult to make a left turn from northbound Chula Vista Drive onto westbound Ralston Avenue during peak traffic periods. The addition of a roundabout facility will help to alleviate this situation by providing residents with multiple options to turn left onto Ralston Avenue—at the current location or at the roundabout.

Design of the roundabout will need to consider its exact location and layout, alternatives such as a traffic signal or other traffic control, and the potential effects on the Notre Dame campus (including the internal circulation and access to Notre Dame Elementary School, parking on the Notre Dame campus, and building locations near the roundabout footprint). The roundabout would serve multiple purposes and is a key portion of the recommended integrated elements between South Road and Chula Vista Drive. If a roundabout is not constructed then other elements of the Ralston Avenue Corridor Study and Improvements Plan may need to be re-considered (i.e. traffic control changes at South Road, at the University driveway and at Chula Vista Drive, roadway striping, traffic calming and speed control, and pedestrian and bicycle gap closure projects on Ralston Avenue).

Ralston Avenue at Chula Vista Drive: As a future option, northbound left-turns from Chula Vista Drive could be restricted if it is determined that the roundabout at the Notre Dame de Namur University driveway is working as intended and motorists are using the roundabout as a means to access westbound Ralston Avenue from northbound Chula Vista Drive.

Ralston Avenue at Notre Dame Avenue: Traffic signal control is recommended for the intersection of Ralston Avenue/Notre Dame Avenue. The existing turn lanes would remain in place and there would be no need for widening. However, as with the University Entrance, minor right-of-way acquisition may be necessary for placement of traffic signal equipment in order to maintain minimum sidewalk clearance width. It is expected that the overall average intersection delay would increase slightly over current conditions. However, the delay experienced by drivers on the southbound Notre Dame Avenue approach would decrease significantly.

Ralston Avenue between Alameda de las Pulgas and Academy Avenue: The goal is to maintain vehicle capacity east of Alameda De Las Pulgas. In conjunction with the pedestrian and bicycle improvements between Alameda de Las Pulgas and Villa Avenue, vehicle capacity and queuing for the traffic signal will be maintained. Eastbound Ralston Avenue will consist of the two through lanes with the curb lane as merge lane. This curb lane would continue to provide access to the Carlmont Center driveway, after which it narrows to one eastbound lane. Left-turn access onto Villa Lane would be maintained from the center lane. Four on-street parking spaces on Ralston Avenue would be removed, east of the Villa Avenue crosswalk in order to initiate the bike lane and create a safer crossing condition for pedestrians. Westbound Ralston Avenue would remain one lane as it approaches Villa Avenue, then open to two lanes on its approach to Alameda de las Pulgas. Because of a desire to enhance the safety of the crosswalk, the existing median will be expanded to the west side of the crosswalk which would then prohibit the left-turn from Ralston Avenue to Carlmont Center. This movement could still be made into the Carlmont Center driveway between Villa Avenue and Academy Avenue where there more left-turn queuing space available.

The PASS program: Will provide updated traffic signal timing plans along Ralston Avenue at Alameda de las Pulgas.

6.1.4 Consequences of Preferred Improvements

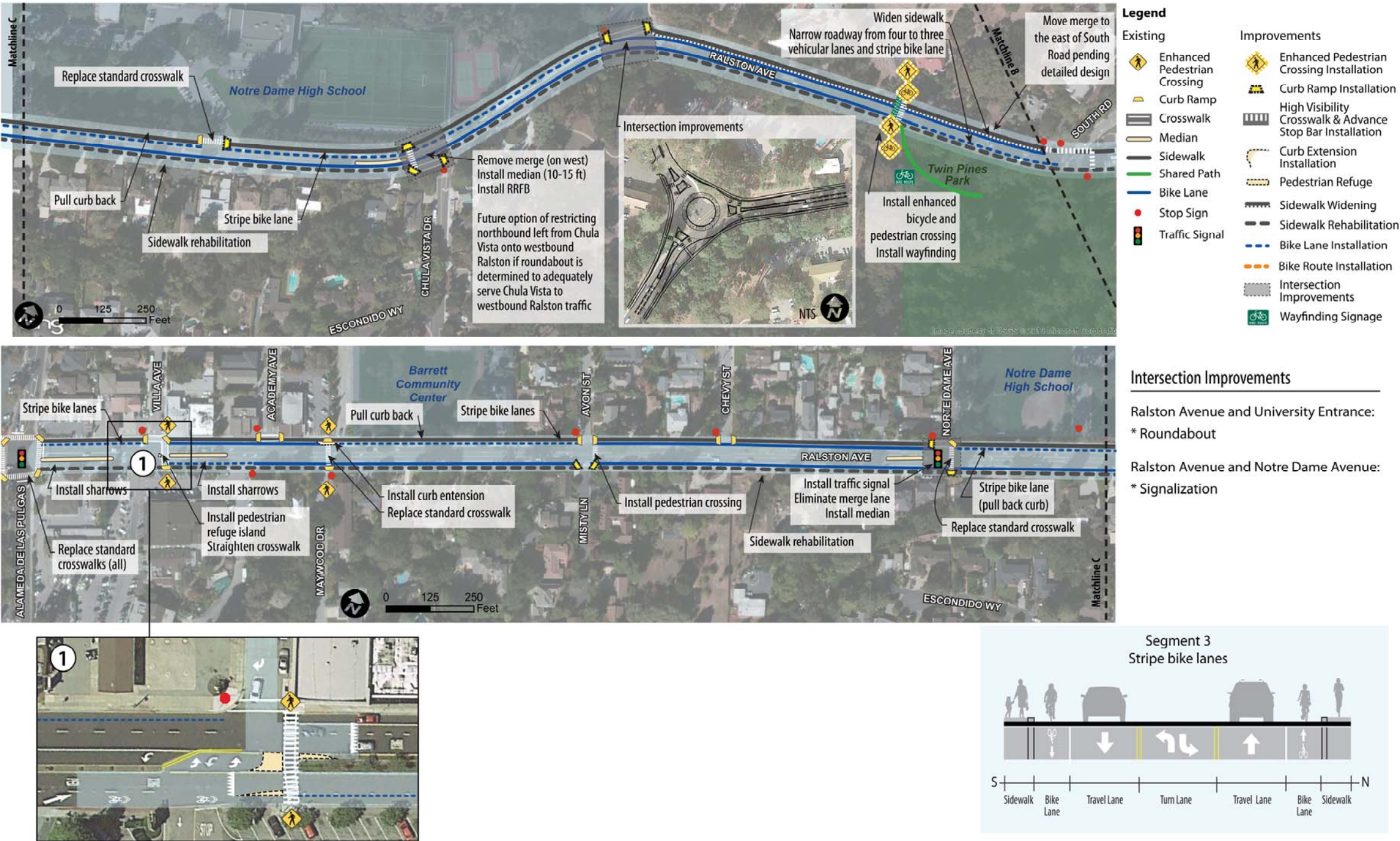
The recommended improvements in this segment would have a number of consequences.

In general, both pedestrian and bicycle travel would be improved and there would be no negative impact on connectivity or travel time.

It is expected a number of the vehicle improvements, including the new traffic signals and modern roundabout, would decrease travel speed and time. However, impacts to overall average delay are expected to be minimal. A number of improvements may require right-of-way acquisition.

See Table 6-1for further details.

6.2 Segment 3: South Road to Alameda de las Pulgas Conceptual Improvement Map



6.3 Benefits and Consequences

Each improvement has been weighed based upon its impact to each mode and the benefits and consequences of implementation.

Table 6-1: Segment 3 Benefits and Consequences

Improvement	Auto	Bike	Pedestrian	Transit	ROW	Benefits	Consequences
Convert Notre Dame de Namur University Driveway to be controlled with a modern roundabout	-	+	o	-	-	<ul style="list-style-type: none">Improves bicycle connectivityPedestrians may feel more comfortable crossing at a roundabout compared to the existing configurationTraffic calmingImproved access to the UniversityPotential for community art or a gateway element within the roundabout	<ul style="list-style-type: none">Decreased travel speeds and increased intersection vehicular delayRequires additional right of wayPotential for future increases in delay and queuingTransit vehicles would be affected by any increase in vehicle delay and travel timePotential changes to Notre Dame internal roadway circulation
Convert Notre Dame Ave to be controlled with a traffic signal	o	+	+	o	o	<ul style="list-style-type: none">Limited or no need for additional right-of-wayPedestrians would benefit from a controlled crossing of Ralston Ave at this locationReduced delay for motorist exiting the neighborhood	<ul style="list-style-type: none">No physical improvements for pedestrian connectivityDecreased travel speeds and increased intersection vehicular delay on Ralston AveTransit vehicles would be affected by any increase in vehicle delay and travel time
Install high visibility crosswalks at the Ralston Ave crossing at: <ul style="list-style-type: none">South RdNotre Dame AveMisty Lane-Avon StAlameda de las Pulgas	o	o	+	o	o	<ul style="list-style-type: none">Increases pedestrian crossing visibilityNegligible impact on vehicular traffic	
Sidewalk Gap Closure and Rehabilitation	o	+	+	+	-	<ul style="list-style-type: none">Improves pedestrian connectivityNo impact on vehicle trafficImproves pedestrian connections to transit	Requires right of way acquisition for gap closure elements
Install high visibility crosswalk and curb extensions at Ralston	o	o	+	+	o	<ul style="list-style-type: none">Improves pedestrian connectivityMinimal impact on vehicle traffic	None

Improvement	Auto	Bike	Pedestrian	Transit	ROW	Benefits	Consequences
Ave/Maywood Dr, retain the existing pedestrian activated flashing lights						<ul style="list-style-type: none">Improves pedestrian connections to transit	
Enhance crosswalk at Ralston Ave/Villa Lane including a center median refuge island	-	o	+	+	-	<ul style="list-style-type: none">Improves pedestrian connectivityNo impact on vehicle traffic	Restricts left turns into shopping center
Install ADA-compliant curb ramps at: <ul style="list-style-type: none">Ralston Ave/Notre Dame de Namur UniversityRalston Ave/Chula Vista DrRalston Ave/Notre Dame High School (both entrances)Ralston Ave/Notre Dame AveRalston Ave/Avon StRalston Ave/Maywood Dr	o	o	+	+	o	Provide enhanced access for persons with mobility impairments	None
Expand median for crosswalk at Villa Avenue, modify left-turn access and prohibit 4 on-street parking spaces, east of crosswalk on south side.	o	+	+	+	o	<ul style="list-style-type: none">Improved pedestrian safety conditions at Villa Avenue crossingImproves bicycle connectivityDecreases vehicle conflicts	<ul style="list-style-type: none">Loss of multiple left-turn access points into Carlmont Center (however, one maintained)Loss of 4 on-street parking spaces on the south side of Ralston Avenue
MTC OBAG Grant for sidewalk improvements between South Road and Notre Dame de Namur University	o	o	+	o	o	<ul style="list-style-type: none">Provides safe and continuous pedestrian access along Ralston Avenue between Notre Dame de Namur University and the downtown area.	None
PASS Program Traffic Signal Timing Plans at Ralston Avenue and Alameda de las Pulgas	+	+	+	+	o	<ul style="list-style-type: none">Improves air quality, travel time reliability, and safety for all users	None

Note: + indicates a positive impact; - indicates a negative impact, o indicates no impact

6.4 Summary of Costs

It is estimated that implementation Segment 3 improvements would cost approximately \$4,988,550.

Significant costs in this segment include the modern roundabout, traffic signal and bike lane installation where the curb needs to be moved back. Cost estimates for right-of-way acquisition are not included in this cost estimate.

Table 6-2: Estimated Segment 3 Summary of Costs

Improvement Type	Cost Estimates
Pedestrian Crossing Improvement	\$143,300
Sidewalk Improvements	\$1,050,200
Bikeway Improvements	\$170,200
Signage and Wayfinding	\$2,000
Vehicle Access Improvements	\$1,960,000
Sub-Total	\$3,101,400
Design	\$831,425
Contingency	\$831,425
Total	\$4,988,550

7. Segment 4: Alameda de las Pulgas to SR 92

7.1 Background, Challenges, Recommended Improvements

7.1.1 Background

This westernmost segment of Ralston Avenue in the City of Belmont is between Alameda de las Pulgas and SR 92. This segment has the most profound elevation change of any of the analysis segments, with a steep uphill grade in the westbound direction. Currently this segment of Ralston Avenue is configured with two lanes in each direction plus a center turn lane.

Land Use and Connectivity

While this area is primarily residential and hilly, there are a number of attractors both along and off the corridor including:

- Fox Elementary School
- Ralston Middle School
- Cipriani Elementary School
- Immaculate Heart of Mary School

Connectivity challenges are described below in greater detail.

7.1.2 Segment Challenges and Goals

Pedestrian Travel

Segment 4 has the least complete pedestrian network within the study area. Community members identified needed improvements for connectivity with Ralston Middle School and Fox Elementary School.

Pedestrian related challenges include:

- Missing sidewalks:
 - 300 feet west of Davis Drive to Lodge Drive connector path (north side)
 - 500 feet west of Pullman Avenue to Cipriani Boulevard (north side)
 - In front of Ralston Middle School parking loop (south side)
 - In front of HWY 92 Park and Ride lot (south side)
- Wide intersection with free right turn lanes at Cipriani Boulevard and no marked crossing on west leg.
- Narrow sidewalks with no buffer between traveling cars and pedestrians.
- Vegetation encroaching on narrow sidewalks.
- Missing curb ramps.



Gaps in the sidewalk network.



The Cipriani Boulevard intersection is wide with free right turn lanes and no curb ramps.



Medians in crosswalks.

- Raised medians that encroach in crosswalk area.
- Reported high vehicular speeds.
- Poor sight lines at intersecting streets require drivers to encroach in crosswalk.
- Community concern that drivers do not look for pedestrians in crosswalks.

The pedestrian improvement goals along this segment are to improve crossing visibility, improve crossing safety, and provide improved sidewalk network.

Bicycle Travel

Segment 4 has no bicycle network. Specific challenges include:

- No on-street bike lanes between:
 - Hwy 92 and 400 feet east of Cipriani Boulevard (north side).
 - 500 feet west of Pullman Avenue and Alameda De Las Pulgas (north side).
 - Hwy 92 and Alameda De Las Pulgas (south side).
- Signed bike lane on north side between Pullman Avenue and 500 feet west of Pullman Avenue. There is no bike lane, only an asphalt sidewalk that is obstructed with poles.
- Bike lane begins 500 feet west of Pullman Avenue (north side) but it is not signed or stenciled at its beginning.
- Signed bike lane at Ralston Ranch Road (south side) directs bicyclists up steep path that is not Caltrans compliant. There is no ramp to take bicyclists from on-street to the path.
- Narrow roadway and landscaped median leave no room for bicycle lanes.
- Poor pavement quality between Hwy 92 and Cipriani Boulevard.
- Pavement curves around drainage grate about 200 feet east of Christian Drive. The asphalt pavement lip may be a hazard to bicyclists.
- Reported vehicular travel speeds make the corridor uncomfortable for bicycling except for the most experience bicyclists.
- No bike parking at Ralston Middle School.

The bicycle improvement goals were to provide dedicated bicycle space either on Ralston Avenue or identify an alternative route.

Vehicle Travel

The majority of this section is served by the four-lane section (two travel lanes in each direction). However, several intersections would benefit from traffic control improvements.



Bicyclist use Segment 4 despite lack of bike lanes.



High vehicular speeds make bicycle travel uncomfortable.

7.1.3 Preferred Conceptual Improvements

Pedestrian Travel Improvements

The pedestrian travel improvements along this corridor focus on providing improved crossing visibility and sidewalk widening and separation of the sidewalk from moving vehicles. This will require minor with reductions to the landscaped median in a number of locations. However, the median will still be wide enough to provide safety and aesthetic benefits.

Ralston Avenue at Pullman Avenue: It is recommended that existing uncontrolled marked crossing be upgraded with a high-visibility crosswalk with a Rapid Rectangular Flashing Beacon (RRFB). The improved markings would increase the visibility of pedestrians crossing the street which is further improved with the RRFB that has been demonstrated to increase driver compliance at crosswalks.

Ralston Avenue between Pullman Avenue and Cipriani Boulevard: It is recommended the sidewalk on the south side be widened to better accommodate pedestrian travel.

Ralston Avenue at Cipriani Boulevard: This Plan recommends the removal of the free right turn lanes and extending the curbs to create a standard intersection. Additionally, it is recommended that a high-visibility crossing be installed on the west leg and the east leg be upgraded to a high-visibility crosswalk.

Ralston Avenue between Cipriani Boulevard and Ralston Middle School Driveway: It is recommended that a landscape strip be installed on the south side to provide a buffer between the sidewalk and the moving vehicles.

Ralston Avenue at Davis Drive: The existing raised median in the crosswalk across Ralston Avenue is recommended to be removed and replaced with a standard pedestrian refuge island. The Crystal Springs Uplands School is proposing to create a campus on the south side of Ralston Drive at Davis Drive. As part of their application, the school should consider access to their site, particularly with respect to Ralston Middle School traffic just to the west of Davis Drive. Based on a review of the historic collision history in this area, prior to the economic downturn there were several instances of eastbound rear-end collisions at the intersection of Ralston Avenue and Davis Drive. Consideration of a dedicated eastbound right turn lane should be considered as part of the Crystal Springs Uplands School analysis. Efforts should be made to coordinate with Ralston Middle School and SamTrans to develop a traffic management that best meets the needs of all users for all existing and future schools.

Ralston Avenue between Davis Drive and Tahoe Drive: The existing sidewalk on the north side of Ralston Avenue does not currently extend all the way to Tahoe Drive. It is recommended that the sidewalk be completed to provide a continuous sidewalk between Davis Drive and Tahoe Drive.

Ralston Avenue at Ralston Middle School Parking Loop: It is recommended that a sidewalk be installed on the south side of the roadway between the entrance and exit to the parking loop in order to provide continuous pedestrian



High Visibility Crosswalk



RRFB



Landscape Strip

facilities on the south side of the roadway.

Ralston Avenue at Tahoe Drive: Removal of the median from the existing crosswalk is recommended in order to ensure ADA compliance.

Ralston Avenue between Tahoe Drive and Hallmark Drive: The existing sidewalk should be moved away from the travel lanes to the fence line to provide a buffer from the moving vehicles.

Ralston Avenue at Belmont Canyon Road: It is recommended that all crosswalks at this intersection be upgraded with high-visibility crosswalks to improve visibility.

Ralston Avenue between Lassen Drive and Hallmark Drive: It is recommended that the sidewalk on the north side of Ralston Avenue be repaved and widened to a standard width.

Ralston Avenue at Hallmark Drive: It is recommended that all crosswalks at this intersection be upgraded with high-visibility crosswalks to improve visibility. Signal timing should be reconfigured for a slower crossing speed to accommodate the children crossing to Fox Elementary School.

As part of the PASS program, changes to the traffic signal timing and phasing of the Ralston/Hallmark intersection are being considered. These changes may include directing westbound Ralston Avenue traffic bound for Ralston Middle School to this intersection to make a U-turn, and the inclusion of an all-pedestrian phase to facilitate pedestrian crossings during school arrival and dismissal times. Initial analysis of the intersection indicated that there is available capacity to accommodate these change while still maintaining an acceptable traffic operation and level of service. Coordination with Ralston Middle School would be required prior to implementation of any changes to the desired arrival and departure routes.

Ralston Avenue at Christian Drive: It is recommended that all crosswalks at this intersection be upgraded with high-visibility crosswalks to improve visibility.

Curb Ramp Installation: ADA-compliant curb ramps could be installed at the following locations to enhance access for persons with mobility impairments:

- Ralston Avenue/Coronet Boulevard
- Ralston Avenue/Alley
- Ralston Avenue/Cipriani Boulevard
- Ralston Avenue/Davis Drive
- Ralston Avenue/Belmont Canyon Road (both intersections)
- Ralston Avenue/Ralston Ranch Road
- Ralston Avenue/Christian Drive
- Ralston Avenue/SR 92 Eastbound Ramps

Bicycle Travel Improvements

There are limited opportunities to provide dedicated bicycle facilities in Segment 4 of this corridor. Installation of bicycle facilities would require removal of travel lanes which would result in traffic delays that were unacceptable to the community during the community’s review of alternatives. However, a number of improvements have been identified.

Ralston Avenue at Cipriani Boulevard: Bicycle detection should be added to the traffic signal control at this intersection.

Ralston Avenue at Belmont Canyon Road: Bicycle detection and enhanced way-finding signs at the eastern end of Belmont Canyon Road should be installed. The bicycle detection will facilitate safer bicyclist movement through the intersection and the wayfinding signs will direct westbound bicyclists to the recommended bike route. The community identified route includes travel through the neighborhood to the north and includes travel on Belmont Canyon Road. Consideration for this route should be given in the City’s upcoming Bicycle Master Plan.

Ralston Avenue between Ralston Ranch Road and Hallmark Drive: It is recommended installation of enhanced community/bicycle way-finding signs to direct users to the pathway on the south side of the roadway.

Ralston Avenue at Ralston Ranch Road: It is recommended that the channelization islands be relocated a few feet to the north to allow for uniform bicycle travel lanes in the westbound direction.

Ralston Avenue at SR 92 Ramps: Green bike lanes are recommended at the SR 92 ramps to delineate the bicycle travel path and alter drivers to expect bicyclists.

Vehicle Travel Improvements

Ralston Avenue at Cipriani Boulevard: This Plan recommends extension of the eastbound left-turn lane on Ralston Avenue to allow for more stacking of vehicles turning left onto Cipriani Boulevard. This will reduce the occurrences of vehicles spilling over from the left-turn lane into the through lanes on Ralston Avenue. The extension will require a modification of the median to extend the eastbound left-turn pocket.

Ralston Avenue at Tahoe Drive: The intersection of Ralston Avenue/Tahoe Drive could be modified to include a traffic signal. This would alleviate the current delay drivers experience while trying to turn northbound from Tahoe Drive onto Ralston Avenue. Installation of the traffic signal would be expected to cost approximately \$350,000.

The operation and performance of the signalized Tahoe Drive intersection would depend on the number of lanes and their configuration on each approach to the intersection. These assumptions were included in the segment travel time data previously presented.

Ralston Avenue at Ralston Middle School Access: If the intersection of Ralston Avenue/Tahoe Drive were signalized, access to the adjacent Ralston Middle School could also be modified. Currently, drivers waiting to complete a



westbound left-turn movement from Ralston Avenue into the school parking lot cause delays on Ralston Avenue during the school drop-off and pick-up periods. A possible modification would be to prohibit this left-turn movement, and instead direct drivers to complete a U-turn movement at the Ralston Avenue/Tahoe Drive intersection with the benefit of the traffic signal, then enter the school parking lot by completing an eastbound right-turn movement. This modification would likely result in an increase in delay at the Ralston Avenue/Tahoe Drive intersection, but reduce overall delay at the school drive and on Ralston Avenue.

Implementation of these modifications would be limited based the need for Ralston Avenue to be wide enough to accommodate the turning radius necessary to complete a U-turn movement at the intersection. Therefore, it is expected that this alternative would only be feasible if the existing road geometry is retained. Furthermore, implementation of these modifications would require coordination with the school district and SamTrans to ensure that service vehicles and buses could adequately enter the school parking lot.

The PASS program: Will provide updated traffic signal timing plans along Ralston Avenue at Cipriani Boulevard, Belmont Canyon Road, Davis Drive, Hallmark Drive, and Christian Drive.

7.1.4 Consequences of Preferred Improvements

The recommended improvements in this segment would have a number of consequences.

In general, pedestrian related improvements would increase pedestrian comfort and visibility however many crossings will remain unprotected.

There are limited opportunities to provide dedicated bicycle facilities in Segment 4 of this corridor and as a result, bicyclists will not have dedicated facilities in this segment. While there are alternative routes, they may be an overall longer route; therefore some bicyclists may choose to continue riding on Ralston.

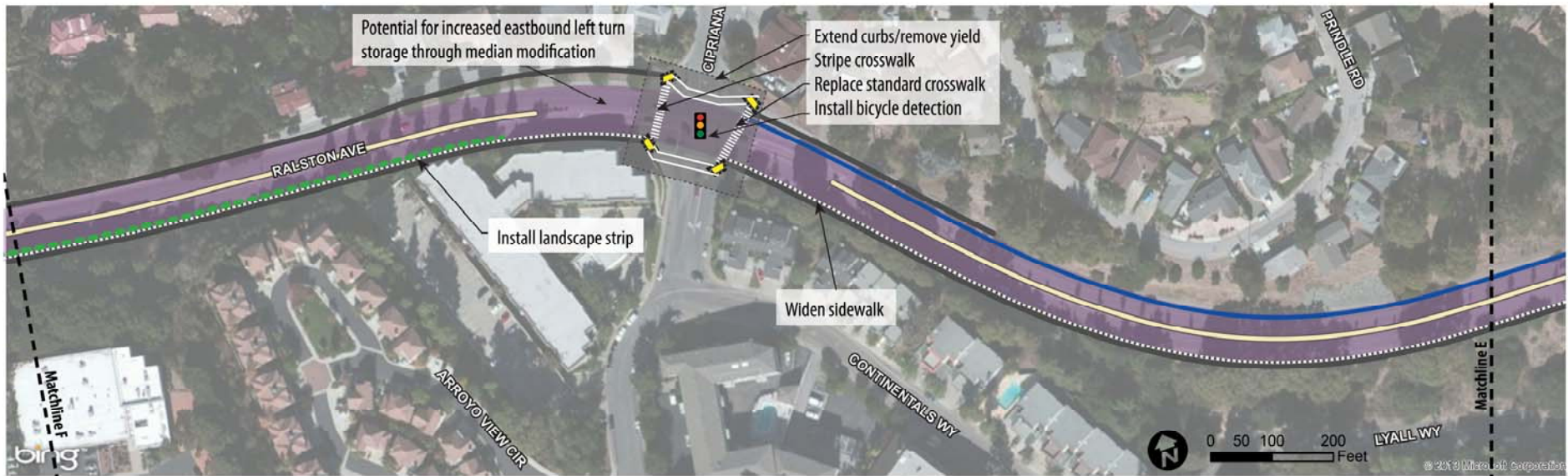
It is expected a number of the vehicle improvements, including the new traffic signals, would increase delay and travel time. However, impacts to overall average delay are expected to be minimal. A number of improvements may require right-of-way acquisition.

See Table 7-1 for further details.

7.2 Segment 4: Alameda de las Pulgas to SR 92 Conceptual Improvement Map (1 of 3)



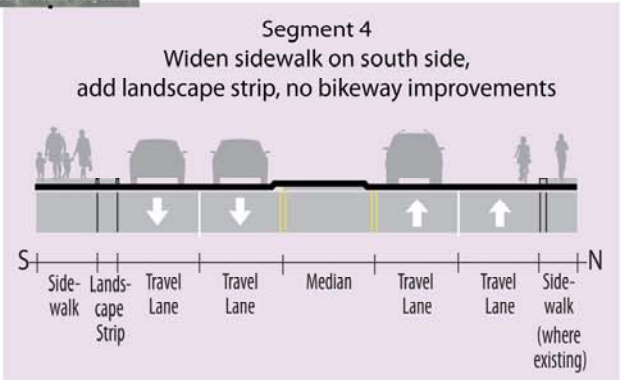
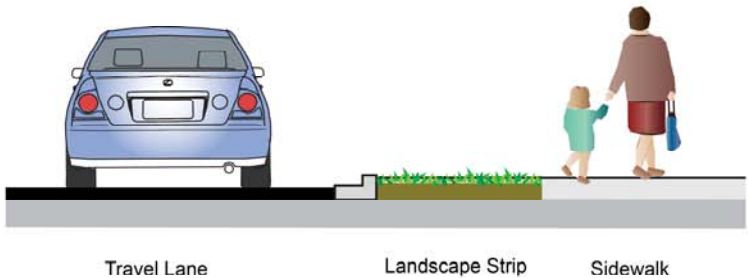
Legend	
Existing	Improvements
Curb Ramp	Enhanced Pedestrian Crossing Installation
Crosswalk	Curb Ramp Installation
Median	High Visibility Crosswalk & Advance Stop Bar Installation
Sidewalk	Landscape Strip Installation
Shared Path	Sidewalk Widening
Bike Lane	Bike Lane Installation
Stop Sign	Intersection Improvements
Traffic Signal	



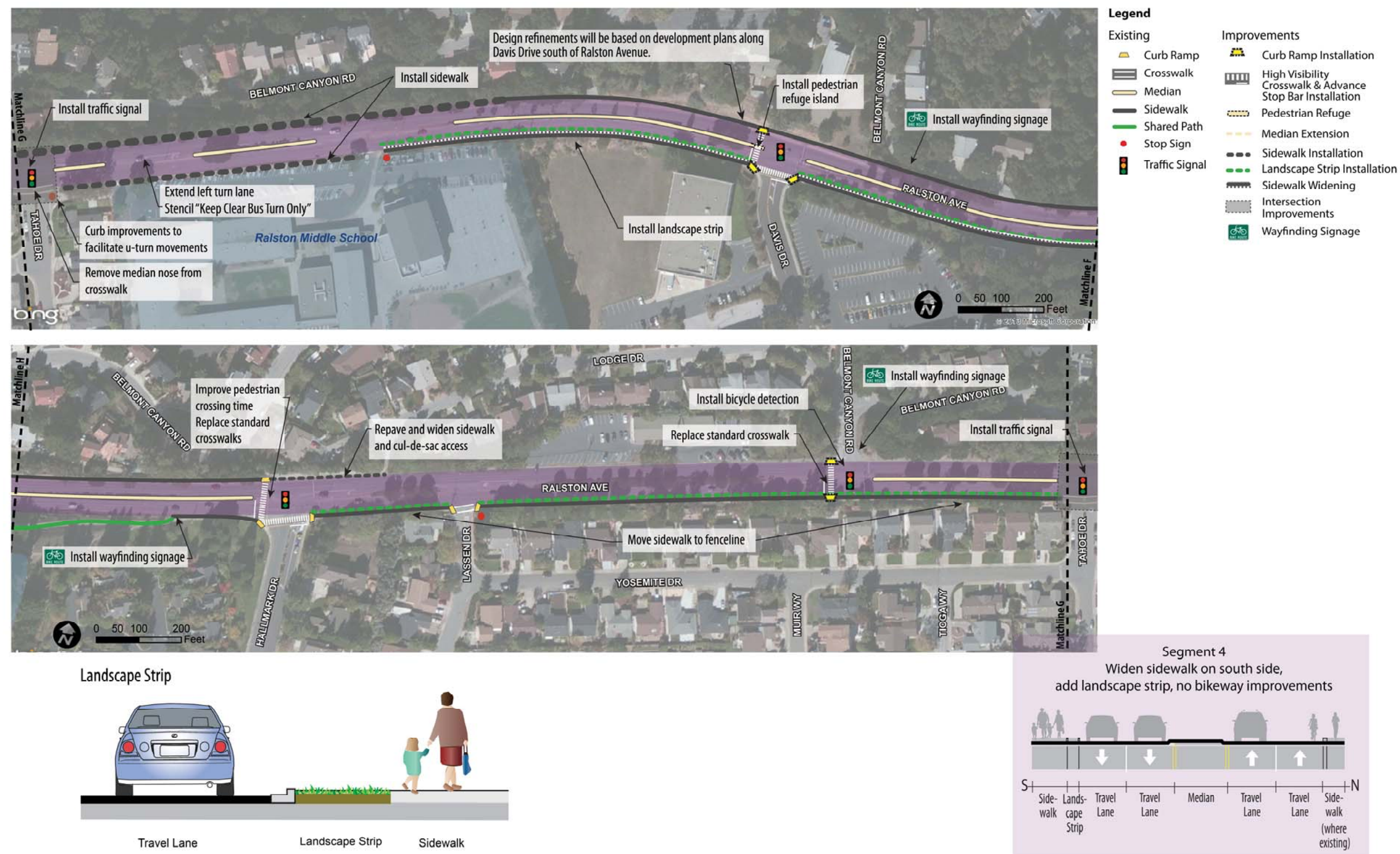
Intersection Improvements

Ralston Avenue and Cipriani Boulevard:
* Close free right turns

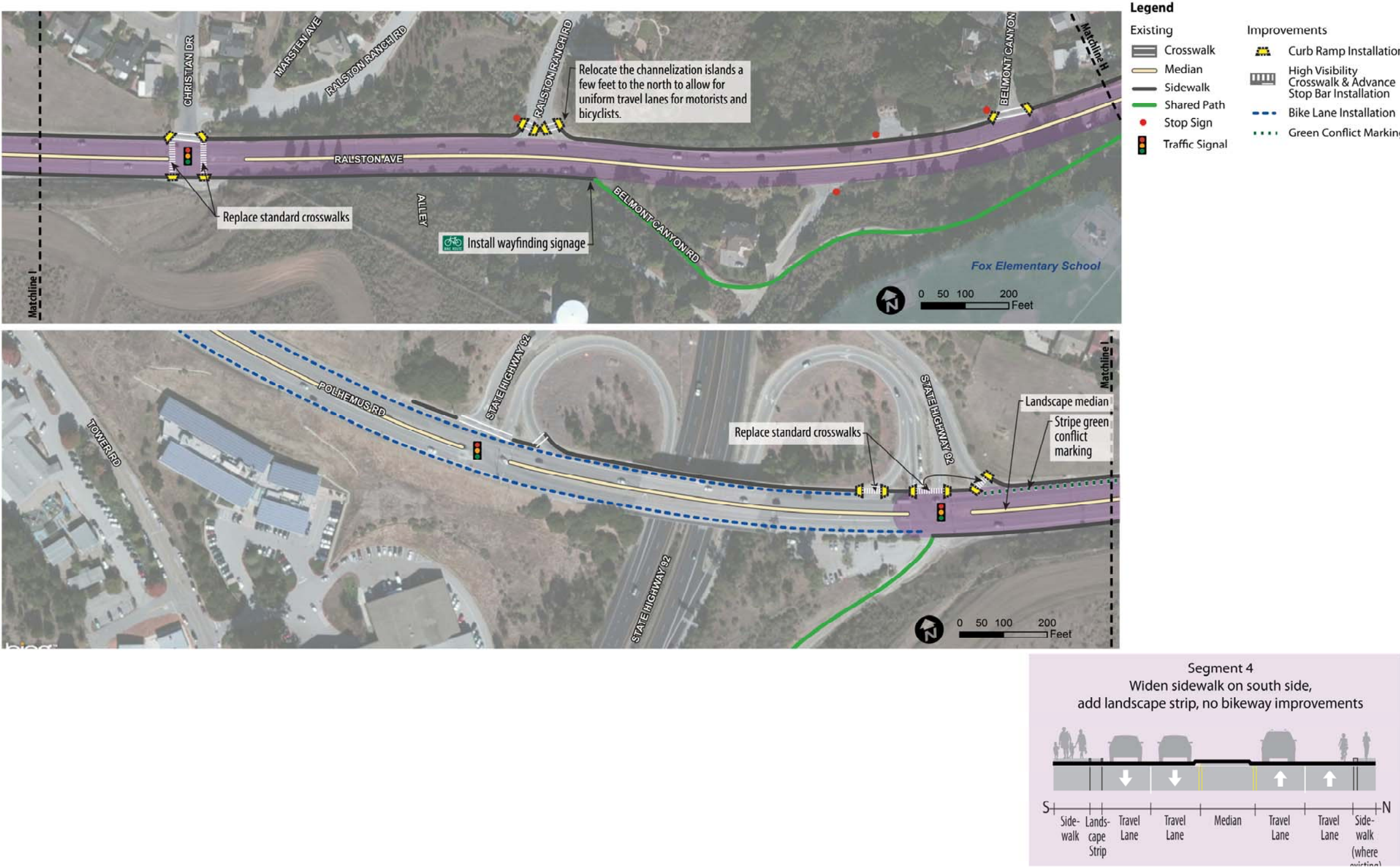
Landscape Strip



7.3 Segment 4: Alameda de las Pulgas to SR 92 Conceptual Improvement Map (2 of 3)



7.4 Segment 4: Alameda de las Pulgas to SR 92 Conceptual Improvement Map (3 of 3)



7.5 Benefits and Consequences

Each improvement has been weighed based upon its impact to each mode and the benefits and consequences of implementation.

Table 7-1: Segment 4 Benefits and Consequences

Improvement						Benefits	Consequences
	Auto	Bike	Pedestrian	Transit	ROW		
Install continuous sidewalks along Ralston Ave.	o	o	+	o	-	<ul style="list-style-type: none">Continuous pedestrian facilities increasing connectivityImproved pedestrian connections to transitNo impact to vehicle traffic	<ul style="list-style-type: none">No improved bicycle facilityBicyclists may not feel comfortable riding in a vehicle laneRequires additional right of way for sidewalk installation
Install Traffic Signal at Ralston Ave/Tahoe Dr. Extend median on the eastern leg to force all Westbound turns into Ralston Middle School as U-turn movements at new Tahoe Dr traffic signal. SamTrans will be excepted from this turn restriction	+	o	+	+	-	<ul style="list-style-type: none">Reduces delay turning to/from Tahoe DrProvide for protected pedestrian crossingImproves pedestrian connectivity to transitWould likely need little or no right of wayRemoves the uncontrolled left-turn movement at the Ralston Middle School	<ul style="list-style-type: none">Increases overall intersection delay and travel timeTransit vehicles would be affected by any increase in vehicle delay and travel timeMiddle School turn restrictions would increase turning traffic at Tahoe Drive
Ralston Ave/Pullman Ave-Lyall Way – install upgraded crosswalk and pedestrian activity warning lights	o	o	+	+	-	<ul style="list-style-type: none">Increased visibility of pedestrian crossingImproves pedestrian connectivity to transitWould likely need little or no right of way	Pedestrian crossing would remain unprotected
Remove southbound yield controlled right-turn movements at Ralston Ave/Cipriani Blvd	-	+	+	o	o	<ul style="list-style-type: none">Eliminates need for pedestrians to cross a yield controlled movementImproves pedestrian connectivity to transit	Increases delay for southbound turning vehicles on Cipriani and vehicles queued behind them.
Ralston Ave/Cipriani Blvd – add bike detection and extend eastbound left turn pocket on Ralston Ave	+	+	o	o	o	<ul style="list-style-type: none">Reduces back-ups for eastbound left turns and spillover into through lanes on Ralston AveImproves bicycle safety and mobility	Requires median modification for left-turn pocket extension

Improvement						Benefits	Consequences
	Auto	Bike	Pedestrian	Transit	ROW		
Ralston Ave/Belmont Canyon Rd – install wayfinding, bike detection, and high-visibility crosswalks	o	+	+	o	o	<ul style="list-style-type: none">Improves bicycle and pedestrian safety and mobilityWould need no additional right of way	
Ralston Ave/Davis Dr – install upgraded crosswalk, and refuge island	o	o	+	o	o	<ul style="list-style-type: none">Increased visibility of pedestrian crossingImproves pedestrian connectivity to Ralston Middle SchoolImproves pedestrian connectivity to transitWould likely need little or no right of way	
Ralston Ave between Lassen Dr and Hallmark Dr – repave sidewalk on the north side of Ralston Ave and widen to a standard width.	o	o	+	o	o	<ul style="list-style-type: none">Improves bicycle safety and mobilityWould need no additional right of way	
Ralston Ave/Ralston Ranch Rd– move channelization islands to the north	o	+	+	o	o	<ul style="list-style-type: none">Improves bicycle path by removing obstaclesWould need no additional right of way	
Upgrade the following sections to have ADA-compliant curb ramps: <ul style="list-style-type: none">Ralston Ave/Coronet BlvdRalston Ave/AlleyRalston Ave/Cipriani BlvdRalston Ave/Davis DrRalston Ave/Belmont Canyon Rd (both intersections)Ralston Ave/Ralston Ranch RdRalston Ave/Christian DrRalston Ave/SR 92 EB Ramps	o	o	+	o	o	<ul style="list-style-type: none">Provide enhanced access for persons with mobility impairments	
PASS Program Traffic Signal Timing Plans on Ralston Avenue at Cipriani Boulevard, Belmont Canyon Road, Davis Drive, Hallmark Drive, and Christian Drive	+	+	+	+	o	Improves air quality, travel time reliability, and safety for all users	None

Note: + indicates a positive impact; - indicates a negative impact, o indicates no impact

7.6 Summary of Costs

It is estimated that implementation Segment 4 improvements would cost approximately \$2,615,700

Significant costs in this segment include the traffic signals and installation of the landscape strip adjacent to the sidewalk on the corridor’s south side. Cost estimates for right-of-way acquisition are not included in this cost estimate.

Table 7-2: Estimated Segment 4 Summary of Costs

Improvement Type	Cost Estimates
Pedestrian Crossing Improvement	\$122,300
Sidewalk Improvements	\$1,132,200
Bikeway Improvements	\$59,800
Signage and Wayfinding	\$4,500
Vehicle Access Improvements	\$425,000
Sub-Total	\$1,745,500
Design	\$435,950
Contingency	\$435,950
Total	\$2,615,700

Appendix A: Methodologies

Analysis Methodologies

Implementation of some of the proposed roadway alternatives or improvement measures is expected to impact vehicle operations. Where this occurs, the following methodologies were used to evaluate impacts. Intersections that may be modified were evaluated using average delay and level of service (LOS) as analysis metrics. Signalized and stop-controlled study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. Operations of these intersections were calculated using the Synchro analysis software.

Intersections that are proposed to be controlled by a modern roundabout were analyzed using methodologies published in the 2010 update of the HCM, including average delay and LOS. Roundabout operations were calculated using the Sidra analysis software. Where the roadway cross-section may be modified, corridor travel time was used as the analysis metric. The travel times were estimated using the Synchro analysis software, based on equations presented in the HCM.

Cost Estimation

Conceptual costs of the potential alternatives and improvements were developed to estimate construction costs. The cost of construction of potential alternatives and improvements were developed based on individual unit costs of various items such as signs and curb ramps from recent public construction projects in the region. While recent construction costs were used as a basis for creating cost estimations, it is important to note that the estimations presented in this report are intended to be broad, planning level estimations. Design, traffic control, mobilization, erosion control, and contingencies were estimated based on a percentage of construction costs. Costs associated with right-of-way acquisition and environmental review were not taken into consideration because of the highly unpredictable nature of these costs.

It is important to note that unit costs for larger projects are typically lower than similar smaller projects because there are cost efficiencies associated with larger projects. As there are a number of possible combinations of improvements, it was assumed for cost estimation purposes that smaller improvements would be grouped together into larger projects to take advantage of cost savings as a result of the larger project size. Therefore, if smaller improvements were to be completed separately, costs associated with each improvement would be expected to be greater than estimated in this report.

Future Traffic Volumes

Future traffic forecasts for the horizon year of 2035 were obtained from the San Mateo Countywide gravity demand model, which is maintained by the City/County Association of Governments of San Mateo County (C/CAG). The C/CAG model is built off of a Bay Area regional model developed by the Santa Clara Valley Transportation Authority (VTA). The details of this model along with the method for translating regional model growth into local intersection turning movement volumes were outlined in the *Ralston Avenue Corridor Study – Issues and Analysis Report*.

Through the process of developing alternatives for the Ralston Avenue corridor, several constraints for using model data were identified that should be considered when comparing alternatives:

- The model was developed assuming that the existing configuration of Ralston Avenue would remain unchanged under future conditions; therefore the roadway capacity would also remain unchanged. However, if any modifications are made to reduce the capacity of Ralston Avenue (such as a road diet), it would also decrease the potential for future traffic growth along the road. Therefore, it is likely that growth in regional traffic along Ralston Avenue would be limited and would be distributed elsewhere. Because of this, it is expected that the majority of growth in traffic along Ralston Avenue would be limited to local sources. Since areas surrounding Ralston Avenue are generally built out, the potential for growth in local-serving traffic is minimal in comparison to regional traffic growth.
- The model is calibrated on a large-scale regional basis and may not take into account some of the local travel characteristics experienced on Ralston Avenue.

Based on this, it is recognized that the traffic volumes developed for future conditions may be an overestimation of future growth.

Appendix B: Frequently Asked Questions

During the course of the Ralston Avenue Corridor Study, certain questions came up more often than others, whether from stakeholders, at community workshops, from elected officials, on the project website, or elsewhere. The questions below are not intended to represent the entirety of questions posed, but rather provide answers to the more frequently asked questions.

Did the Plan consider continuous bicycle lanes along the entire length of Ralston Avenue?

The Ralston Avenue Corridor Study evaluated alternatives that included bicycle lanes along all segments of the roadway. It was found that installation of bicycle lanes on Ralston Avenue west of Alameda de las Pulgas would require removal of at least one travel lane. The benefits and consequences of each alternative were presented in a working paper as well as in a Community Workshop. Removal of one or more travel lanes would result in increased travel time, congestion and delay. Also, geometric and topographic constraints would make it very difficult to modify the center median in order to add bicycle lanes. The overwhelming community feedback indicated a general lack of support for removal of any travel lanes west of Alameda de las Pulgas. Therefore, the recommended Ralston Avenue Corridor Study and Improvements Plan includes enhanced signage directing bicyclists to alternative routes such as Belmont Canyon Road, which is currently used as an alternative to Ralston Avenue.

What safety elements are included in the Ralston Avenue Corridor Study?

The Ralston Avenue Corridor Study and Improvements Plan recommended several safety improvements. One of the primary focus areas of the Plan is on school access safety, particularly near the elementary schools and Ralston Middle School. Much of the emphasis in the Plan was placed on improving pedestrian and bicycle crossings on Ralston Avenue. The Plan includes several traffic calming elements that address speed and safety, including traffic signals, a roundabout, pedestrian hybrid beacon (HAWK) signals, crosswalks, and pedestrian and bicycle path gap closure recommendations.

Isn't much of the traffic on Ralston coming from outside Belmont?

A common perception is that a large source of congestion on Ralston Avenue is from drivers traveling through the City between SR 92 and US 101, without stopping within the City of Belmont. An origin-destination survey was conducted to determine the portion of vehicular traffic passing through Belmont compared to local community traffic. This was done by setting up bluetooth readers at four locations along the corridor between SR 92 and US 101. It was determined that during the morning peak period approximately 5.5 percent of westbound traffic surveyed traveled through the Ralston Avenue corridor without stopping in Belmont, increasing to 8.7 percent of traffic during the p.m. peak period. In the eastbound direction, it was found that approximately 9.2 percent of traffic during the a.m. peak period and 7.1 percent of traffic during the p.m. peak period passed through the City of Belmont on Ralston Avenue without stopping.

Can speed limits be lowered on Ralston Avenue?

It has been asked if the speed limit can be lowered in an effort to increase safety. Under current State law, it is difficult to reduce speed limits on many streets. Cities are obliged to perform speed surveys (every five years) and adjust speed limits to reflect the "85th percentile speed" or the speed that 85% of drivers are traveling. This requirement is based on the assumption that most drivers travel at the "design speed" of a particular road, and to prevent cities from setting "speed traps" and issuing citations by setting speed limits that are lower than necessary.

Lowering speeds when it is not justified through engineering measures specified in the California Vehicle Code (CVC) may lead to unintended consequences. These include a wider range of driver speeds, which in turn could lead to a higher collision potential. If the lowered speed limits are not strictly enforced, and if it is comfortable for the driver to exceed the speed limit, it may convey the message to drivers that exceeding a speed limit is acceptable. Also, if the speed limit does not comply with CVC requirements, enforcement of the speed limit would be restricted.

In 2009, the State of California made it more difficult for cities to lower speed limits. City traffic engineers can authorize a reduction in the speed limit on a particular street if there is a study that documents how the reduction was required to

address factors that are not "readily apparent" to drivers. For example, if the 85th percentile speed is measured to be 37 mph, the speed limit can only be reduced to 35 mph unless a study shows specific "objective factors" indicating a need to reduce it by another 5 mph, in this case to 30 mph. "Objective factors" typically means a history of collisions, although pedestrian and bicyclist safety are explicitly noted as considerations. In addition, consideration would also be given to the volume of traffic and physical characteristics of the roadway. Lower speeds will increase travel time and extend queues, affecting the operation of the roadway and side streets accessing Ralston Avenue.

What are the key features of the proposed Roundabout at the NDNU Entrance?

A roundabout at the NDNU entrance will provide a mechanism for traffic calming and speed moderation. In addition to being a gateway feature, it will improve access to the school and facilitate U-turn movements, bicycle connectivity, and pedestrian safety. There may be slight increases in delay to traffic on Ralston Avenue as traffic slows down to maneuver through the roundabout. The roundabout will likely require additional right of way, and consideration of NDNU building footprints and internal circulation, as well as access to Notre Dame Elementary School will need to be part of the design. The roundabout is also a key element of the integrated recommendations on Ralston Avenue between South Road and Chula Vista Drive.

Is Masonic Way a candidate for a Bicycle Boulevard?

Masonic Way currently has Class II bicycle lanes. The shared parking/bike lane is currently substandard, with poor pavement quality and 11-foot travel lanes. There have been concerns expressed about door-zone conflicts. If converted to a Bicycle Boulevard, the Class II bicycle lanes would be removed and sharrows would be installed. Eight-foot parking lanes would remain along with a 15-16-foot shared vehicle-bicycle lane. The centerline stripe would be removed, and traffic calming elements would be considered for implementation. Also, the intersection control devices would be need to be re-evaluated to determine if modifications to them would be beneficial for implementation of a Bicycle Boulevard. Overall, however, Masonic Way could be a candidate for a Bicycle Boulevard, and this option is noted in the recommended Plan.

What are the traffic signal and intersection design criteria and parameters?

There are five unsignalized intersections identified within the study area which may require upgrades such as traffic signals, in pavement flashing crosswalks, flashing beacons, geometric modifications and/or other traffic control devices.

These intersections are:

- Ralston Ave/Tahoe Dr
- Ralston Ave/Notre Dame Dr
- Ralston Ave/Chula Vista Dr
- Ralston Ave/Notre Dame University Rd
- Ralston Ave/South Rd

With the exception of Ralston Avenue/Tahoe Drive and Ralston Avenue/Notre Dame University Road, all intersections have pedestrian crosswalks across Ralston Avenue. Four of these unsignalized intersections are located between the signalized intersections at Alameda de las Pulgas and Sixth Avenue, a distance of 3,900 feet without a controlled crossing.

A traffic signal warrant analysis was performed for each intersection to determine if a traffic signal would be warranted. The 2012 *California Manual on Uniform Traffic Control Devices* (CA MUTCD) establishes nine warrants to determine potential need for intersection signalization:

1. Eight-Hour Vehicular Volume
2. Four-Hour Vehicular Volume
3. Peak Hour

- 4. Pedestrian Volume
- 5. School Crossing
- 6. Coordinated Signal System
- 7. Crash Experience
- 8. Roadway Network
- 9. Intersection Near a Grade Crossing

For planning purposes, the Peak Hour Volume Warrant (Warrant Number 3) was used to evaluate potential need for signalization. Vehicular volumes at all five of these intersections currently satisfy the peak hour volume traffic signal warrant. It should be noted that, as stated in the CA MUTCD, the “satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.” Prior to installing a signal “adequate trial of other alternatives that could cause less delay and inconvenience to traffic” should be implemented and observed.

Decisions regarding traffic signal installation should consider the safety for motorists, pedestrians, and bicyclists, the overall traffic flow in the area, and other traffic operations as meaningful guides when developing intersection treatment recommendations. There are instances where a peak hour traffic signal warrant is satisfied when a low volume of side street traffic faces delays when accessing the major street, but the intersection overall operates in a safe and efficient manner. There are also situations where the side street delay is encountered only for a short or concentrated period of time each day (such as near a school). In such cases the city may consider other means of traffic control that address the situation without creating unintended consequences during other times, which might occur from signalization. As is the case with the setting of speed limits, consideration should also be given to the volume of traffic and physical characteristics of the roadway, sight distances, the effects on travel time and queues, and how the change in traffic control would potentially affect the operation of the roadway and side streets accessing Ralston Avenue.

Because of these instances where traffic signal warrants may be satisfied, but other traffic improvements would provide equal or better operations, the satisfaction of a peak hour traffic signal warrant alone along the Ralston Avenue corridor should not necessarily be considered to require installation of a traffic signal under the City’s Transportation Impact Analysis. Rather, as development projects are evaluated in Belmont, either along the Corridor or projects that contribute traffic volumes to the corridor, any determination the City makes regarding the appropriate traffic mitigation measures (i.e. a change from an unsignalized intersection to a signalized intersection) or other roadway improvements should be consistent with the Ralston Avenue Corridor Study and Improvements Plan. This will allow the City the flexibility to prescribe as mitigation measures those controls that are consistent with the Ralston Avenue Corridor Study and Improvements Plan and that are necessary for the operational improvement and the community character along the Corridor.

Appendix C: Planning for Implementation and Funding

To realize the goals of the Ralston Avenue Corridor Study and Improvements Plan, an implementation approach should be developed that translates the conceptual vision into meaningful change over the short, mid and long-term. Because much of the vision is centered on the functional design elements of the roadway itself, the implementation will inherently focus on cost considerations, funding strategies, and agency coordination.

Planning Level Costs

An understanding of preliminary construction costs is key for effective implementation. Without this understanding, funding prioritization and the allocation of limited city resources is impractical to evaluate. As such, Chapter 2 of this Plan presents a summary of the preliminary opinion of probable construction costs for the proposed improvements based on the conceptual designs generated in the Ralston Avenue Corridor Study and Improvements Plan. These cost estimates assume that sufficient ROW generally exists along the corridor in order to construct the identified improvements. Refinements to design options through a design phase may also influence cost estimates. However, with the known conceptual cross-sections in place, the opinions of probable construction costs described in Chapter 2 provide a general expectation of the costs for construction of the improvements.

What Are Possible Funding Sources For The Ralston Avenue Corridor Study and Improvements Plan?

In today’s funding realities, a combination of funding resources will be needed for the implementation of the corridor improvements. For some projects, development fees could generate funding and leverage City dollars for the reconstruction of key segments of the corridor. However, in other instances, a combination of public funding resources (i.e., City, County, State, etc.) will be necessary in order to bring about the complete change envisioned as part of this Plan. In any case, the need for creative and comprehensive funding is critical. To help inform the prioritization of funding for the corridor, the section below discuss a hierarchy of priority segments in an effort to help the City strategically focus available resources.

The Ralston Avenue Corridor Study and Improvements Plan is estimated to cost about \$8 Million - \$10 Million and will require several funding sources. The Plan is designed to have a high likelihood of success for competitive grant funding, from federal grants to state, regional, and local sources. Grant programs often require a local match to receive funding. The City has already been very successful in securing some funding for the Corridor through bond grant opportunities, and allocation of some General Fund dollars. However, other strategies that could be utilized to help secure the additional funding needed to complete final design and reconstruction of the corridor are explored below.

Grant programs include the Caltrans Active Transportation Program (ATP), which is comprised of both federal and state funds. Belmont submitted an application to Caltrans for ATP funds for the Ralston Avenue Corridor Study and Improvements Plan in May 2014 and an application to the Metropolitan Transportation Commission (MTC) for Round 2 ATP funding in July 2014.

In the Bay Area, the Metropolitan Transportation Commission (MTC) requires Bay Area cities and counties to adopt complete streets resolutions in order to be eligible for One Bay Area Grant funding. San Mateo County has developed its policy requirement to be inclusive of the MTC requirement, so that local jurisdictions only needed to adopt one policy to comply with both requirements. A resolution adopting a Complete Street Policy was adopted by the City of Belmont on January 8, 2013.

There are other sources of funds, particularly at the regional or county level, that could fund part of the Plan, including programs that address school transportation, bicycle and pedestrian facilities, traffic signals, improvements near transit hubs (Priority Development Areas), and other elements.

The City can also consider other ways to implement portions of the Ralston Avenue Corridor Study and Improvements Plan. Some possible options are developer payments to mitigate project-specific impacts, development agreements, traffic impact fees applied to all development in the Corridor, and possibly General Fund money. General Fund money is typically limited and generally used to provide local matching funds for larger grant programs.

A traffic impact fee (TIF) program would review all planned development that may contribute to the need for the various improvements in the Corridor and would divide the cost of those improvements (or some percentage of the total cost) among the expected developments. TIF fees are typically imposed based on the projected trip generation from the project. The City of Belmont currently does not have a TIF program; to establish such a program would require a Nexus Study to establish the fee amount. An advantage of such a program is that each project’s ‘fair share’ of the improvement cost could be easily determined when the project is proposed.

In the absence of a TIF program, project-related traffic impacts and required mitigation must be determined on a project-by-project basis. Developments can be required to mitigate direct on-site and off-site traffic impacts, such as installing transportation improvements within the site and along the street frontage and at intersections and roadway segments affected by the project. When mitigation is determined on a project-by-project basis, the City must demonstrate that the required mitigation has a ‘nexus’ to the impact of the development and is ‘roughly proportional’ to the development’s impact. Where a project has an impact but the cost of a physical improvement may be excessive, the City may determine a fair share cost contribution toward specific improvements based on, for instance, the percent of peak hour or daily trips that the development contributes to the roadway or intersection. A fair share contribution is often used when there are identified improvements (such as those identified in the Ralston Avenue Corridor Study and Improvements Plan) and an associated cost estimate.

If a developer requests City approval of a development agreement, the City also can negotiate a contribution towards transportation improvements (i.e. road reconstruction, etc.) in the absence of an identified impact, when there is a deemed mutual benefit to the project and the community. With developer contributions, the City may be able to fund specific projects identified in the Plan.

In summary, there are various funding sources that may be available and should be considered to implement the Ralston Avenue Corridor Study and Improvements Plan.

Next Steps

In order to make the Ralston Avenue Corridor Study and Improvements Plan a reality, all of the strategies discussed previously should be explored as viable options for implementation. While a significant emphasis should be placed on securing financial resources and ensuring that the prioritization of those resources be programmed in an effective way, functional next steps will also include:

- Preparing design schematics and environmental documentation for the corridor to meet requirements of the California Environmental Quality Act and, where federal funds are anticipated, National Environmental Policy Act.
- Coordination with various stakeholders along the alignment to identify the roles of each as it relates to implementation of the conceptual design alternatives.
- Securing additional necessary funding and preparing full design plans for the highest priority segment(s) of the Corridor as the funding opportunities or circumstances present themselves to the City.
- An assessment of the potential benefits of a Traffic Impact Fee program.